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Elaine Amato-Vealey
University of Rhode Island

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DETERMINANTS OF EXERCISE BEHAVIOR AFTER A MYOCARDIAL
INFARCTION: BELIEFS, INTENTION, BEHAVIOR

BY

ELAINE AMATO-VEALEY

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY
IN
NURSING

UNIVERSITY OF RHODE ISLAND

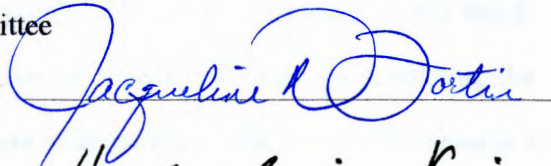
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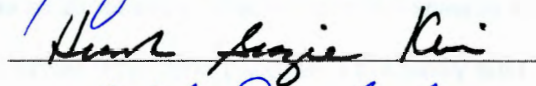
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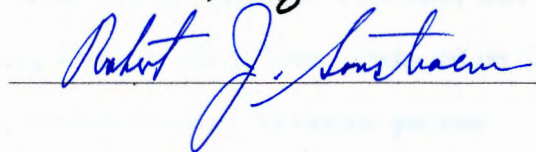
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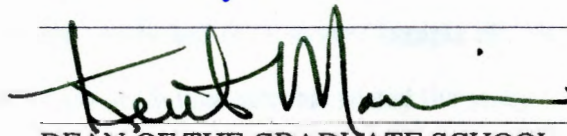
Dissertation Committee

Major Professor

Jacqueline R. Dorian

Hank George Keni

Robert J. Souther

Kent Mann

DEAN OF THE GRADUATE SCHOOL

UNIVERSITY OF RHODE ISLAND

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ABSTRACT

Exercise is a critical component of cardiac rehabilitation associated with physical and psychological benefits; however, patients are often reluctant to participate in cardiac rehabilitation programs. Their reticence often grows out of their own attitudes towards exercise and the attitudes of people they value. Ajzen and Fishbein's (1980) theory of reasoned action suggest that personal attitudes and subjective norm influence behavioral intention which in turn predicts the likelihood of performing a specific behavior. Both attitude and subjective norm can be measured directly and indirectly. However, Ajzen and Fishbein report the direct measures of attitude and subjective norm result in better prediction of behavioral intention than the indirect measures. Therefore, this study tested the direct and indirect measures of Ajzen and Fishbein's theory of reasoned action in predicting the behavioral intention to enroll in and subsequent attendance behavior in a 36-session exercise cardiac rehabilitation program for post myocardial infarction patients. This study was conducted in three phases in eight participating hospitals. Phase I was conducted on 50 post myocardial infarction patients who identified a belief inventory for cardiac patients contemplating exercise. Phases II and III were conducted on a second sample of 194 post myocardial infarction patients that resulted in a 6-scale measure that tested the study hypotheses. The regression analyses of Phase III revealed that the attitude and subjective norm measures taken directly and indirectly were found to be significant predictors for the behavioral intention to enroll in a cardiac rehabilitation exercise program. Limitations of the study, recommendations for practice and implication for further research are discussed.

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Chapter I

Introduction

The Problem

Myocardial infarction is the leading cause of death in America. The 1987 United States Statistics (estimates) revealed the incidence of myocardial infarction at 1,500,000 victims per year, with a mortality rate of 513,700 (American Heart Association, 1990). Data from the Framingham Heart Study revealed 45% of all myocardial infarction victims are under the age of 65, and 5% are under age 40 (American Heart Association).

Almost 80% of the people who have a heart attack will survive, but many will have another one (Kannel, Hjortland, McNamara, & Gordon, 1976). "No matter how uncomplicated the initial clinical course the survivors are always faced with the inherent risk of another myocardial infarction or sudden death" (Naughton, 1985, p. 21). The incidence of potential reoccurrence of a myocardial infarction necessitates preventive measures be incorporated into the prescribed medical regimen to ultimately change behavior.

Theory of Reasoned Action

The term "reasoned action" represents the assumption that people consider the implications of their behavior and make conscious decisions to engage or not engage in actions based on the use of information available to them (Ajzen & Fishbein, 1980).

The theory first introduced by Fishbein in 1967 has been further developed, refined and tested (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). The theory is based on the assumption that human beings are quite rational and make systematic use of information available to them. Ajzen and Fishbein's goal is to predict and understand human behavior. The simplicity of the theory is a result of its use of relatively few constructs to explain the attitude-behavior relationship. In its current form, the theory is

best represented in summary by the equation: $B \sim I = (AB) W_1 + (SN) W_2$. In this equation, B is a specific overt behavior under the volitional control of the individual, I is the intention to perform that behavior, AB is the attitude toward the behavior, and SN is the subjective norm or the individuals' perception of what most people who are important to the individual think he or she should or should not perform regarding the targeted behavior. W_1 and W_2 are empirically determined standardized regression coefficients.

Both attitude and subjective norm can be measured directly and indirectly. The direct measure of attitude is derived by having subjects rate the targeted behavior on bipolar scales with adjective endpoints such as good-bad and wise-foolish. The direct measure of subjective norm is derived by having subjects rate the likelihood that significant referents think the subject should engage in the targeted behavior. Although Ajzen and Fishbein's theory states that the direct measures of attitude and subjective norm should predict behavioral intention better than the indirect measures, the indirect measures are more useful in that their subcomponents provide the researcher with more information that can be used to develop strategies for behavioral change (Riddle, 1980).

The indirect measure of attitude is derived by two subcomponents: beliefs about the outcomes (b_i) of a behavior and the evaluation of those outcomes (e_i) where i represents the number of salient beliefs elicited. A sum of the product of the beliefs (b_i) weighted by their respective evaluations (e_i) produces the indirect measure of attitude toward the behavior.

The indirect measure of subjective norm also is derived by two subcomponents: normative beliefs (nb_j) and motivation to comply (mc_j), where j represents the number of salient referents elicited. A sum of the product of normative beliefs (nb_j) weighted by their respective motivation to comply (mc_j) produces the indirect measure of subjective norm toward the behavior (Appendix A).

Statement of the Problem

This study utilized the model and methods of Ajzen and Fishbein's theory of reasoned action (1980) to identify beliefs that predict the behavioral intention to enroll and participate in an cardiac rehabilitation exercise program. To facilitate this examination, this study was conducted in three phases. The purpose of Phase I was to elicit beliefs regarding exercise in a cardiac rehabilitation exercise program from a sample of post myocardial infarction patients. Phase II consisted of developing a preliminary inventory and administering it to 194 post myocardial infarction patients. The purpose of Phase II was to perform an item analysis and to refine the instrument. The purpose of Phase III was to test whether pertinent responses to the scales developed in Phase II predicted exercise intentions and/or participation in an exercise cardiac rehabilitation program.

The specific hypotheses tested in Phase III were:

Hypotheses

- Hypothesis I: Attitude and subjective norm measured by the direct and indirect indices will significantly predict the behavioral intention to enroll in a cardiac rehabilitation exercise program.
- Hypothesis II: Attitude and subjective norm measured by the direct and indirect indices will significantly predict participation behavior in a cardiac rehabilitation exercise program.

Long Term Goal

The ultimate goal of this study was to develop a conceptual foundation for producing and promoting a behavioral change (i.e. modify lifestyle post myocardial infarction in relation to exercise). In order to change behavior, it becomes necessary to determine those components that influence behavior. According to the theory of reasoned action, behavioral change is ultimately a result of a change in beliefs.

Therefore, determining a person's salient beliefs and salient referents provides a viable foundation upon which to construct nursing strategies for inducing behavioral change. The theory of reasoned action provides a scientific basis for uncovering the determinants of intention to enroll and participation behavior in an cardiac rehabilitation exercise program.

Background of the Problem

Most people who live through a myocardial infarction will be required to change their behavior and lifestyle to survive. Modifiable habits which put patients at-risk would include cigarette smoking and failure to treat hypertension and/or elevated blood cholesterol. Other factors have been associated with increased risk of cardiovascular disease, although their significance and prevalence have not been precisely determined. Physical inactivity has not been clearly established as a risk factor for heart disease, but when lack of exercise is associated with excess weight, it unquestionably becomes a factor contributing to heart disease. Cardiac rehabilitation, in order to be successful, must include modifications of behaviors that put patients at-risk.

The goals of cardiac rehabilitation programs for myocardial infarction patients are designed to return the patient to an optimum lifestyle and enhance psychologic recovery, while encouraging a wide variety of behavioral changes. Supervised exercise is the major focus of cardiac rehabilitation programs. Exercise has been associated with improvements in cardiovascular efficiency (Blackburn, 1983), as well as a sense of psychological well-being (Frolicher & Brown, 1981).

The survivor of a myocardial infarction receives numerous directives and prescriptions from physicians, nurses and family members concerning adherence to specific behaviors. Many patients find it difficult to change in all of the ways suggested. They initially comply with the prescribed medical regimen but their adherence declines after they begin to recover (Carmody, Senner, Malinow, & Matarazzo, 1980; Mark,

Kershkwitz, Mark, & Coleman, 1975; Taglizacozzo & Ima, 1970; Tirrell & Hart, 1980). This decline may be attributed to the resumption of usual activities dominated by modifications (McMahon, Miller, Wikoff, Garrett, & Ringel, 1986). Hence, it is important for the health professional to understand the determinants of exercise behavior and their relationship to one another as they influence this behavior post infarction.

The Cardiac Patient and Exercise

Of the promising available measures, regular physical activity has come to be considered a valuable prescription post infarction. Although research is lacking regarding the incidence of reoccurrence of infarction with and without participation in a cardiac rehabilitation program, numerous research studies detail the positive results of an exercise regimen post infarction. Parchert and Simon (1988) suggest that there are physiological benefits from the adaptive changes that occur to meet the increased oxygen demands of aerobic exercises (p. 11). Other studies have revealed significant reductions in resting heart rate and exercise heart rate for a given exercise level (McArdle, Karch & Katch, 1986; Rovario, Holmes & Holmsten, 1984; Naughton, 1974) and a reduction of both systolic and diastolic blood pressure both at rest and during submaximal work (Hedback, Perk & Perski, 1985; Rovario et al., 1984; Stern & Cleary, 1981). Radionuclide angiography has revealed that exercise therapy improves stroke volume and cardiac output, thus enhancing the ejection fraction, that is, ratio of blood ejected from the left ventricle to end diastolic volume (Fontana, Kerns, Rosenberg, Marcus & Colonese, 1986; McArdle et al., 1986). Folkins, 1976 and McArdle et al., 1986 found that exercise therapy increases maximal oxygen consumption, which determines the aerobic exercise capacity for an individual. This allows the individual to exercise at a higher workload with a lower oxygen demand (Parchert & Simon, 1988). A growing body of research thus affirms that exercise of an aerobic nature improves cardiovascular efficiency.

The psychological benefits of exercise have also been well-documented. After participating in an exercise program, patients felt better about themselves and exhibited greater confidence (Erdman, Duivenvoorden, Verhage, Kazemier & Hugenholtz 1983; Finnegan & Suler, 1985; Giese & Schomer, 1986; Rovario et al., 1984). Positive effects of exercise participation on mood and emotional stability have also been reported (Folkins, 1976; Giese & Schomer, 1986; Shepard, Kavanagh & Klavara, 1985). In addition, exercise has been associated with decreased depression and anxiety after myocardial infarction (Folkins, 1976; Schomer & Noakes, 1983; Shepard et al., 1985; Stern & Cleary, 1981). It has been documented that exercise therapy reduces stress and enables patients to cope better with a chronic illness (Folkins & Amsterdam, 1977; Sutterley, 1979). In general, exercise participation does much to improve the psychological status of the individual, thereby enhancing the quality of life.

Participation in an exercise program can produce social benefits as well. Participation in group exercise fosters a sense of camaraderie among post-coronary patients. For example, Erdman et al., 1983 Hedback et al., 1985 and Rovario et al., 1984, noted that individuals participating in group exercise activities were able to return to work and experienced less work-related stress.

While the various benefits of exercise post myocardial infarction have been well-documented, exercise rehabilitation trials have not demonstrated a lower morbidity in exercising coronary-heart-disease patients (Rechnitzer et al, 1983; Wilhelmson, Sanne, Elmfeldt, Grimby, Tibblin & Wedel, 1978; Kallio, Hamalainen, Hakkila & Luurila, 1979; Shaw, 1981). Exercise rehabilitation has not been positively associated with a reduction in the risk of recurrence of myocardial infarction (Wilhelmsen, Sanne, Elmfeldt, Grimby, Tibblin & Wedel, 1978; Shaw, 1981; Rechnitzer et al. , 1983). Oldridge, Guyatt, Fischer and Rimm (1988), however, carried out a meta-analysis on the combined results of ten randomized clinical trials. Their results suggested that for selected post myocardial infarction patients, cardiac rehabilitation has a beneficial effect on mortality, but not on

non-fatal recurrent myocardial infarction. Similarly, Naughton (1985) reported that in three of five clinical trials of myocardial infarction patients, exercise therapy tended to reduce mortality rates; however, exercise did not affect reoccurrence rates of nonfatal infarctions. Cardiac rehabilitation programs, on the other hand, are designed to lessen the immediate adverse physiologic and psychologic impact of the infarction and enhance the long-term physical, emotional and vocational status of the individual. Schroeder (1985) articulated the goal of cardiac rehabilitation as, "not only add years to life but add life to years" (p. 21).

Cardiac Rehabilitation

The concept of cardiac rehabilitation connotes three major components: education, counseling, and exercise therapy, the latter being a crucial component of cardiac rehabilitation. Cardiac rehabilitation programs are standardized across the country. Based on an exercise-stress-test, the cardiac patient's physical status is assessed and exercise prescription is then formulated. Cardiac patients exercise at 60% of their maximal heart rate to ensure safe, yet beneficial, exercise effects. The participants exercise three times per week for half an hour to one hour. Such sessions include warm-up exercises, peak exercise and cool-down exercises. Educational classes on various topics related to risk-factor-modification and individual counseling are provided. This phase of cardiac rehabilitation (known as Phase 2) includes those patients who are approximately 4 to 6 weeks post-cardiac event. This phase extends over a 3-month time period, with a total of 36-rehabilitation sessions. Cardiac rehabilitation programs are funded by various third party reimbursement systems, yet are designed specifically for post myocardial infarction patients, post cardiac surgery patients, balloon angioplasty patients and unstable angina patients.

The Role of the Nurse

The challenge for the nurse caring for the survivor of a myocardial infarction lies in helping the patient integrate the physical and psychosocial changes into an acceptable lifestyle (Owen, 1987). More specifically, the nurse's role in the rehabilitation process encompasses: (1) educating the patient about risk factors and lifestyle modification, (2) providing emotional support to patients and their families, (3) assessing exercise tolerance and improvement therein, (4) motivating patients, (5) improving patients attitudes about health risks, and (6) decreasing fear and self-doubt about the future for patients with coronary artery disease (Parchert & Simon, 1988). Within the past five years nurses have focused more on increasing and promoting participation in the exercise regimen of the rehabilitation process (Parchert & Simon).

It has not been shown definitively what factors motivate patients to enter and participate in exercise programs (Holm, Fink, Christman, Reitz & Ashley, 1985). Few studies account for the belief factors that may influence an individual's participation in a rehabilitation program. One theoretical formulation that addresses the beliefs, attitudes, social norms and intentions of specific behaviors is Azjen and Fishbein's (1980) theory of reasoned action. The patient's attitudes and perceptions of what significant others believe about exercise in a cardiac rehabilitation program may determine the behavioral intention to enroll in a cardiac rehabilitative exercise program and therefore participation in the program. Beliefs are amenable to change. The nurse caring for the survivor of a myocardial infarction is in a critical position to influence this patient's attitude through education, role-modeling and instillation of values related to health and exercise. It was thus necessary to examine those components that have been suggested to influence and determine behavior. One underlying key variable to understanding patient behavior is attitude; the patient's learned predisposition to respond to a situation in a consistently favorable or unfavorable way.

Historical Perspective on Attitude

The concept of attitude has played a major role throughout the history of social psychology (Ajzen & Fishbein, 1980). The simple concept of attitude, first alluded to as a state of preparedness or a set to make a particular overt response, has grown over time into a complex, multi-dimensional concept consisting of affective, cognitive and conative components (Fishbein, 1967). As early as 1862, Herbert Spencer, a psychologist, stated that "the concept of attitude has been recognized as a factor contributing to judgmental processes, where much depends on the subject's attitude of mind while he or she is coping with a controversy" (Ajzen & Fishbein, 1980, p. 13). Znaniecki and Thomas (1918) were the first to use the attitude concept to explain social behavior. They viewed attitudes as individual mental processes that determine a person's actual and potential responses. This notion of attitudes as behavioral dispositions went unchallenged until the late 1960s.

Conceptual and methodological issues associated with the attitude construct complicated one another in early attitude research. However, L. L. Thurstone (1931) and Thurstone and Chave (1929) made significant contributions by applying psychometric methods to the measurement problem. Thurstone developed a scale from which an attitude score represented a person's position on a bipolar affective continuum in relation to the attitude object. "In Thurstone scaling, the attitude score represents a person's evaluation of an object implied by a set of his beliefs, intentions, or actions" (Ajzen & Fishbein, 1980, p. 15). Very early on, Thurstone recognized the attitude-behavior inconsistency by noting similar attitudes among individuals, yet arrived at by entirely different routes. Rensis Likert (1932) then proposed a similar, yet simpler, scaling procedure in which summated attitude scores reflect patterns of beliefs, intentions or actions. Like Thurstone scaling, the Likert scale resulted in a single score that represented the degree to which a person is favorable or unfavorable with respect to the attitude object. A given attitude score could again reflect different patterns of beliefs,

intentions or actions. These early scaling techniques provided the groundwork for further psychometric developments.

Conceptually, early attitude research of the 1930s was predominantly descriptive in nature and used attitude surveys. G. W. Allport (1935) addressed the complexity of the attitude concept, inferring that attitudes are comprised of affect, cognition and conation. However, early research utilizing unidimensional attitude scales, which captured affect only, revealed a close link between attitude and behavior. R. LaPiere's 1934 study of racial prejudice against Chinese people impacted attitude research with a classic example of the failure of attitudes to predict behavior using affect only as an indicator of attitude. As additional studies supported this finding, L. W. Doob (1947) proposed a rationale similar to that of Thurstone where similar attitudes can be expressed in different actions. As time passed, further research expanded the definition of attitude to include affect and cognition; this return to an idea, first proposed by Allport, was an effort to explain the low attitude-behavior relationship. During the 1950s, additional attitude measurement techniques were developed to capture the cognitive and conative components of attitude as well. Of particular interest, are two scaling techniques, the Guttman scale (1944) and Osgood, Tannenbaum and Succi semantic differential scale (1957). Both scales result in a single score representing a person's evaluation of an attitude or affect. These additional attitude measurements techniques did little to verify the attitude-behavior relation. However, Thurstone and Likert's early work significantly impacted future directions for the attitude-behavior dilemma. Both Thurstone and Likert scales rely on beliefs or intentions to infer an individual's attitude. This implies that in providing a measure of affect, the standard scaling procedures already take into account cognitions, conations or both (Ajzen & Fishbein, 1980). In light of this revelation, measurement as well as conceptualization problems of the attitude-behavior relations prevailed. Ajzen and Fishbein (1980) revealed that most early attitude investigators worked on the assumption that attitudes explain and predict behavior and, thus, dealt with

studies designed to examine attitude formation and change. Actual investigations dealing with the attitude-behavior relationship were lacking.

The Cardiac Patient and Reasoned Action

Consideration of attitudes and subjective norms constitute a beginning toward understanding why patients behave the way they do. Ajzen and Fishbein (1980) assert that possession of the factors that influence behavior requires knowledge of the determinants of the attitudinal and normative components of the patient's environment. Ajzen and Fishbein view beliefs as underlying a person's attitudes and subjective norm, ultimately determining intentions and behavior. Only salient beliefs (those beliefs attended to regarding a given object or situation) are the immediate determinants of attitude while salient referents (those individuals that will influence behavior) determine the subjective norm measure. In the final analysis, a patient's behavior is best explained by reference to beliefs. Beliefs, therefore, influence attitude and subjective norm, which influence intention, which, in turn, influence behavior. For the nurse caring for the survivor of a myocardial infarction, insight into the beliefs of the post infarction patient regarding a cardiac rehabilitation program provide an understanding of factors influencing a behavioral change.

According to the theory of reasoned action, behavioral change is ultimately the result of a change in beliefs. Ajzen and Fishbein explain that their theory consists essentially of a series of hypotheses linking beliefs to behavior, with each hypothesis requiring empirical verification along the way. Only when intervening relations have been empirically demonstrated between each successive hypothesis can a specific set of beliefs be said to explain behavior.

This study was an attempt to look systematically at the underlying beliefs post myocardial infarction patients have about exercise in a cardiac rehabilitation program. The specific task of this investigation was to link the beliefs about exercise behavior of

the post myocardial infarction survivor to the intention to enroll in a cardiac rehabilitation program and subsequent participation behavior via Ajzen and Fishbein's strategies. Phase I provided the belief item pool for development of the Phase II questionnaire. Phase II encompassed item analysis and instrument refinement of the questionnaire developed from the belief item pool. Phase III of this study tested the validity of the developed instrument.

Significance of the Study

Field work with a representative sample of post myocardial infarction patients revealed that they use the following activities to comply with the exercise prescription of the physician: self-directed activities such as walking; exercise directed by non-medical personnel, such as attending aquatic programs or aerobic classes; and medically-supervised activity, such as participation in a cardiac rehabilitation program. There are some patients, however, who do not comply with their physician's exercise prescriptions at all, these patients presumably do not believe that exercise is a critical component of rehabilitation. Few researchers have examined the beliefs of post myocardial infarction patients regarding exercise in a cardiac rehabilitation program.

Health professionals concern themselves with various strategies to alter patient behaviors, but do not always base these strategies on a professional understanding of the motivators of patient behavior. Through application of the theory of reasoned action, this study was undertaken to examine whether such strategies should be based on an understanding of the determinants of behavioral intention; specifically, the determinants of attitude and subjective norm that undergrid behavioral change. Post myocardial infarction patients were selected for study since they comprise a large population that require substantial lifestyle change. Of particular interest in this study was the patient's willingness to engage in recommended exercise regimens following myocardial infarction. This study, therefore, was designed to provide a better understanding of the

relative contributions of the direct and indirect determinants of behavioral intention and behavior. These assessments were made at hospital discharge, and at the completion of 36 sessions in a cardiac rehabilitation exercise program, respectively. The information obtained from the first phase of this study reflected the pattern of beliefs common to survivors of a myocardial infarction toward exercise. In addition, the findings of this study have the potential to contribute to the ongoing research of the theory of reasoned action by complimenting the predictability of the theory, assessing the role of behavioral intention, and acknowledging the usefulness of the theory's constructs and their determinants to influence behavior, specifically patient behaviors.

Definition of Terms

For the purpose of this study, the following definitions of terms were used:

Behavior: Observable acts that are studied in their own right. Behavior in this study is operationally defined as: attendance in a cardiac rehabilitation program generated from the number of sessions attended in a 36 session cardiac rehabilitation program.

Behavioral intention: The individual's intention to perform a specific behavior. Behavioral intention is operationally defined as a score derived from a semantic differential type scale designed to reflect the subjects intent to enroll in a cardiac rehabilitation exercise program.

Attitude: An individual's predisposition to respond in a consistently favorable or unfavorable manner with respect to the behavior. Attitude is operationally defined by a direct measure of attitude (A_B) and an indirect measure of attitude ($\sum b_i e_i$).

Direct measures of attitude (A_B) are generated from a 7 point semantic differential scale.

Indirect measures of attitude ($\sum b_i e_i$) are comprised of two measures:

Beliefs about the outcome of a behavior (b_i) are generated from a 7 point bipolar scale.

Evaluations of those outcomes of a behavior (e_i) are generated from a 7 point semantic differential scale.

Subjective Norm: One's perception that most people, who are important to the individual, think one should or should not perform the behavior in question. Subjective norm is operationally defined by a direct measure of subjective norm (SN) and an indirect measure of subjective norm ($\sum nb_i mc_i$).

Direct measures of subjective norm (SN) are generated from a 7 point bipolar scale.

Indirect measures of subjective norm ($\sum nb_i mc_i$) are comprised of two measures:

Strength of normative beliefs concerning the referents (nb_i) generated from a 7 point bipolar scale.

Motivation to comply with the referents (mc_i) are generated from a 7 point unipolar scale.

Referent: A person whose opinion about the behavior is valued by the subject. Referents in this study are those individuals cited in the Phase 1 questionnaire (e.g. Which individuals or groups of people would approve/disapprove of your exercising in a cardiac rehabilitation program?).

Assumptions of the Study

Assumptions of the study were: patient gender, culture, occupation, or personality would not affect the behavioral intention, or plan to enter a cardiac rehabilitation program and/or subsequent exercise behavior at 4 to 6 weeks post-infarct and 36-weeks respectively; all patients would be able to financially afford a cardiac rehabilitation program; all patients would be provided similar explanations regarding cardiac rehabilitation at discharge in all participating hospitals ;and all patients would have access to a cardiac rehabilitation program. A final assumption is that all programs are equally good and equally attractive.

Limitations of the Study

The sample of subjects in this study were first time myocardial infarction patients or post myocardial infarction patients who have not previously attended a cardiac rehabilitation program. Generalization of the findings to other patient populations (coronary-artery bypass, coronary angioplasty, arthroectomy patients, etc.) or settings (general physical activity programs, etc.) is not appropriate.

Predischarge anxiety and/or pressures generated by transition from the sick role to what Baric (1969) has termed the "at-risk" role may alter the study's findings since the final questionnaire was administered just prior to discharge. It is possible that the nursing recruitment efforts during hospitalization accounted for a positive behavioral intention to enter a cardiac rehabilitation program at hospital discharge.

Other intervening variables that could have affected the study results were: attempts to acquire medical knowledge after myocardial infarction by, for example, reading medical literature, etc. Personal contact with others who have had a myocardial infarction, or who know an individual who has experienced a myocardial infarction, may also have altered the study results.

Chapter II

Conceptual Framework

Dulany's Theory of Propositional Control

Amidst the attitude-behavior controversy of the 1950s, Don Dulany (1961, 1964) proposed a theory of propositional control. Developed initially in the framework of learning theory, Dulany's proposal was essentially a theory that led to the prediction of overt behavior. This theory was developed within the context of studies examining and testing verbal conditioning and concept attainment. Dulany's concern was with predicting the probability with which an individual will make a particular verbal response or class of verbal responses in a particular situation.

Critical to Dulany's theory is behavioral intention, as the immediate antecedent of overt behavior. Dulany was concerned with a precise and specific type of behavioral intention or one's intention to perform a given action in a given situation. Hence, Dulany focused on measuring the subject's intention to perform the specific behavior he was interested in predicting.

Dulany's theory takes the form of a linear multiple regression equation, where behavioral intention (BI) is composed of two distinct components, each of which has two parts. The first component of this equation comprises a quantification of the subject's hypothesis that the occurrence of the particular response will lead to a certain event or class of events. This is termed RHd. RHd is multiplied by a numerical expression of the subject's evaluation of (or attitudes toward) those events labeled A. The second component of this equation is made up of a measure of the subject's beliefs regarding what is expected to be done or what should be done in the situation. This is termed BH. BH which is multiplied by a numerical expression of the subject's motivation to comply or the degree to which the subject wants to comply (Mc). The precise beta weights to be

given these two components as determinants of behavioral intention within a given situation, may be determined by standard multiple regression procedures (W_0 W_1).

The central equation of Dulany's theory is: $BI = [(RHd) (A)] W_0 + [(BH) (Mc)] W_1$.

Dulany's theory (Fishbein, 1967) has been developed within the context of studies of verbal conditioning and concept attainment. Moreover, Dulany has been concerned with predicting the probability with which an individual will make a particular verbal response or class of responses (p. 487).

Fishbein's Adaptation of Dulany's Theory

Martin Fishbein (1967) proposed a theoretical model of behavioral prediction as an adaptation of Dulany's theory . Fishbein's formulation provides a comprehensive understanding of the attitude-behavior relationship by identifying other variables that interact with attitudes as determinants of overt behavior. Fishbein (1967) conceptualized beliefs as determinants of attitude and behavioral intention as a consequence of attitude. Later research revealed that behavioral intention could be predicted from attitude, and intentions were related to behaviors (Ajzen & Fishbein, 1974). Fishbein asserted (1967a) that behavioral prediction entails knowledge of beliefs, attitudes, behavioral intention and behavior.

Fishbein (1967) re-labeled the constructs of Dulany's theory maintaining the models intent and behavioral prediction. Fishbein redefined the first component of Dulany's theory, $[(RHd) (A)]$, and conceptualized it as an individual's beliefs about the consequences of performing a specific behavior. This component, along with the evaluative aspect of those beliefs, comprises the attitude measure (A_{act}). Fishbein emphasized that the attitude of interest must be an attitude about performing a given behavioral act as opposed to an attitude about a given object, person or situation. Fishbein conceptualized the second component of Dulany's theory, $[(BH) (Mc)]$ as normative beliefs. Normative belief specifies an individual's beliefs of what significant

others perceive as appropriate for the behavioral act. This component, along with the degree to which the individual is motivated to comply (Mc), comprises the subjective norm measure (NB) (Mc).

Fishbein (1967) made minor changes in the meaning of the constructs, as well as in the way in which they are measured. Fishbein (1967) also attempted to emphasize the importance of beliefs as building blocks of attitude and subjective norm, with behavioral intention as a link in the causal chain to behavior.

It can be seen that Fishbein's (1967) adaptation of Dulany's theory leads to the prediction that an individual's behavioral intention and performance of the behavior are a function of attitudes and subjective norms; and attitudes and subjective norms are themselves functions of beliefs. Fishbein's theory is algebraically expressed as follows:

$$B - BI + [Aact] W_0 + [(NB) (Mc)] W_1$$

The two major components of this model are weighted for their importance in the prediction of behavioral intention ($W_0 W_1$). For some individuals, normative considerations may be more important in determining behavioral intention than are attitudinal considerations. "The assignment of the relative weights to the determinants of behavioral intention greatly increases the explanatory value of the theory " (Ajzen & Fishbein, 1980, p. 6).

Research during the early 1970s revealed a low empirical relation between knowledge of a subject's attitude and prediction of behavior. Fishbein & Ajzen (1974) proposed that the attitude-behavior relationship is contingent upon its relationship to other determinants, specifically behavioral intention. These authors concluded that a person's attitude toward an object may not be related to any single behavior which is performed with respect to the object as postulated by the traditional attitude approach. However, attitude should be related to the overall pattern of behavior. This notion takes into account beliefs, attitude, and behavioral intention as determinants of behavior. This hypothesis was proposed to account for the low attitude-behavior relation.

Theory of Reasoned Action

The model holds that two types of constructs underlie any intention under the individual's volitional control (Miniard & Cohen, 1981). Both constructs, attitude and subjective norm, are functions of beliefs.

Underlying assumptions of the theory of reasoned action are that: (1) behavior is directly caused by behavioral intentions (conation), which are caused by attitudes (affective evaluations), which in turn reflect beliefs about the consequences of behavior influenced by the subjective evaluation of the consequences, and (2) subjective norm functions as an independent variable which is caused by normative beliefs and motivation to comply, which indirectly effects behavior through its effect on intentions.

Subjective norms are thought to reflect beliefs about the behavioral expectations of significant others, influenced by the motivation to conform to them, summed over all significant others. All other variables are assumed to effect behavior via their effects on the cognitions or beliefs which underlie attitudes / subjective norms and on the model weights.

Ajzen and Fishbein's model (1980) provides a deeper understanding of human behavior by observing the effects of variables external to the basic theory . Factors such as personality traits, demographic characteristics, habits, social norms, situational factors and traditional measures of attitudes toward persons or situations have been found by Ajzen and Fishbein to exert no influence on any specific behavior, since they have no consistent effects on the beliefs underlying the behavior. Thus, the relation between external variables and behavior, is at most, indirect. Ajzen and Fishbein posit that variables external to the theory cannot provide explanatory value of behavior. The theory of reasoned action proposes a single set of constructs that account for the observed relations between external variables and behavior.

This model distinguishes the three components of the traditional attitude concept (affect, cognition and conation). Ajzen and Fishbein's model represents a prominent and influential attitude-behavior model. Liska (1984), Ajzen and Madden (1986) have proposed various revisions to the present model in an ongoing effort to improve the attitude-behavior relationship. The theory of reasoned action appears to be a potentially useful model to predict, explain, and understand the determinants of human behavior that influence the actions of post myocardial infarction patients.

Ajzen and Fishbein (1980) posit the behavioral criterion or the behavior of interest entails four elements: action, target, context and time. There must be correspondence between each of these elements in relation to the behavior of interest. The action element reflects the behavior of interest; the target element is that at which a behavior is directed; the context and time elements reflect the context in which the behavior occurs and the time at which it is performed. Each of these elements can be very specific or more general. These behavioral elements are important to consider when defining the behavior of interest. Once the behavior is chosen, it must be measured. Clearly, the way observations are made influences the data obtained. Ajzen and Fishbein suggest that clearly defining the behavioral elements are preliminary measures when applying the theory of reasoned action. For use in this study, the behavioral elements of the theory were specified as: the behavioral criterion (action) was exercise participation with respect to a specific target, the post myocardial infarction patient, in the context of a cardiac rehabilitation exercise program, at four to six weeks after hospitalization.

In this study, the theory of reasoned action provided the guiding principles to understand and predict the behavioral intention to enroll in a cardiac rehabilitation exercise program and subsequent participation in the program (number of sessions attended) for the post myocardial infarction patient.

Chapter III

Review of Literature

This chapter provides a review of the literature related to the theory of reasoned action proposed by Fishbein (1967), and modified by Fishbein and Ajzen (1975) and Ajzen and Fishbein (1980). Empirical research associated with the theory of reasoned action is reviewed, with a focus on research related to the beliefs of cardiac patients in regard to exercise behavior. Application of the theory of reasoned action to nursing research is also reviewed. The final section of this chapter offers a justification for applying the theory of reasoned action to investigate the intention to enroll in a cardiac rehabilitation exercise program and subsequent exercise participation behavior.

Attitude research has long plagued american social psychology. Social psychologists have used attitude to explain overt behavior. However, an accumulation of contrary evidence has frequently refuted this relationship in both the laboratory (Berg, 1966; Bray, 1950; Kutner, Wilkins & Yarrow, 1952; LaPiere, 1934) and field settings.

Laboratory Studies

Ajzen and Fishbein (1970) designed an experiment to test the validity of a theoretical model of behavioral prediction presented by Fishbein (1967) in the context of a Prisoner's Dilemma (PD) game situation. Over the total sample of subjects, the correlations between behavioral intentions and game behavior were .897 and .841 ($p < .001$) for the two games. The high correlations between behavioral intention and behavior were deemed to be attributable to the fact that the measures of behavioral intention were: (a) behavior specific (b) taken immediately prior to the behavior and (c) were taken after eight warm-up trials allowing the subject to form fairly accurate beliefs about consequences of cooperating and about the partner's expectations. This hypothetical situation provided early insight into the complexity of understanding or

predicting human behavior while raising many theoretical and methodological problems associated with Fishbein's (1967) model.

In an attempt to provide answers to the problems they discovered in the model, Ajzen and Fishbein (1972) examined four hypothetical decision situations: investment, operation, renting and transplant--each involving a different degree of risk in making a behavioral choice. Each situation included information about whether the subject's own estimate of probability of success was high or low and whether the probability of success as estimated by close family and friends was high or low. Consistent with Fishbein's model, attitude and subjective norm were found to predict behavioral intentions in all four hypothetical situations with correlations ranging from .299 to .814. Attitude carried more weight than subjective norm in determining intentions.

The utility of the Fishbein model in the family planning area was demonstrated by Jaccard and Davidson (1972) in a test of two hypotheses: (1) behavioral intention to use birth control pills is a function of (a) one's attitude toward using birth control pills and/or (b) one's normative beliefs weighted by one's motivation to comply with those perceived norms and (2) attitude toward using birth control pills is a function of (or is highly correlated with) the sum of one's beliefs about the consequences of using birth control pills times the evaluation of those beliefs. The findings which indicated substantial correlations among attitude, subjective norm and behavioral intention ($r = .84$ $p < .01$) and indirect attitude measures ($r = .79$ $p < .01$) partially supported Fishbein's model.

According to Fishbein's model, variables not included in the theory can affect behavioral intentions and behavior indirectly, by influencing attitude, subjective norm and/or the relative weights of these components. Ajzen and Fishbein (1974) investigated two such variables: (1) situational variations that influence interdependence of group members and (2) subject's beliefs about and attitudes toward their co-workers. A series of three studies was conducted in which the task of three-person groups was to balance a board in the shape of an equilateral triangle by moving their respective corners of the

board. Two behaviors were assessed: the number of instructions the subject sent to a co-worker (communicative behavior) and the proportion of instructions from each co-worker with which the subject complied (compliance behavior). Subjects were 144 male undergraduates. Results supported the model when subjects' intentions to perform communicative and compliance behavior correlated highly with their attitudes toward the behaviors and with their normative beliefs about the behaviors. Behavioral intentions correlated significantly with communicative behavior ($r = .690, p < .01$) and compliance behavior ($r = .211, p < .01$), although intervening events such as percent of reinforcement and incompatibility were found to attenuate the intention-behavior relation (Ajzen & Fishbein, 1974).

Field Studies

Newman (1974) tested Fishbein's model (1967) in work organization to assess its usefulness in organizational situations. Newman's study examined the relative efficacy of Fishbein's model and traditional job attitude measures as predictors of absenteeism and job turnover in 108 nursing home employees. The data of this study suggested that traditional job attitude measures were more efficacious in predicting absenteeism while Fishbein's model was more effective in predicting voluntary resignations.

Fishbein and Coombs (1974) tested the validity of Fishbein's model in the context of a political election. Application of the theory to voting behavior allowed them to investigate the locus of effect of a political campaign on the beliefs of the voting public. It was found that the basic assumptions of Fishbein's model fit well with the data collected in the 1964 presidential election between Goldwater and Johnson. Specifically, the correlations between the direct measure of attitude toward a candidate and the specific measure of attitude ranged from $+ .69$ to $+ .87$. The direct measure of attitude was consistently a better predictor of voting behavior. It was found that the specific measure of attitude toward a candidate is more highly related to voting intention than is the direct

measure. Voting intentions correlate even more highly with the actual vote while both the direct and indirect measures of attitude correlated well with actual voting behaviors. Fishbein and Coombs' data suggested additional validity for Fishbein's model within the political arena.

In response to continuing skepticism about Fishbein's (1967) model and Fishbein and Ajzen's (1975) refinements of that model, which was at variance with the traditional measure of attitude, Ajzen and Fishbein (1977) re-examined the attitude-behavior relationship with a review of pertinent empirical research. The extensive review supported the contention that strong relationships between attitude and behavior were obtained only when there was high correspondence between at least the behavioral elements (action, target, context, time) which define the behavior.

Helping behavior too, has been assessed using the theory of reasoned action. Pomazal and Jaccard (1976) found that donating blood during a college blood drive was significantly related ($r = .59$) to the intention to donate blood. Behavioral intention was found to relate to attitudes and subjective norms (multiple $R = .60$) in this study. Also, Pomazal and Jaccard found that both donating behavior and the corresponding intention were significantly correlated with perceived moral obligation to donate blood ($r = .43$ and $r = .50$, respectively).

Zuckerman and Reis (1978) compared and evaluated the predictive efficacy of three behavioral models (Fishbein's Model, Schwartz's Model, Snyder's Model) for one type of helping behavior, donating blood. The subjects were 251 undergraduate students enrolled in two introductory psychology courses. Attitude, subjective norm and behavioral intention were the predictor measures for donating blood behavior. Hierarchical regression analysis revealed intentions accounted for 20% of the variance in blood donations. When attitudes and social norms are added to the same question, attitudes add a statistically significant proportion of variance (3.3%, $p < .005$). Of the three models tested, Fishbein's model received the strongest support. Path analysis

revealed a direct link between attitude and behavior. Zuckerman and Reis postulated that the intention-behavior relationship decays more rapidly than the attitude-behavior relationship. Thus, when the behavior is immediate, attitudes do not add to intentions in predicting behavior; however, when the behavior is deferred, the relationship between intention and behavior is weaker, and attitudes help significantly in accounting for the behavior.

Saltzer (1980) applied Fishbein and Ajzen (1975) theory of reasoned action to investigate the determinants of behavioral intentions toward losing weight and actual weight loss. The questionnaire measured the predictor variables of the model: personal attitudes, subjective norms and behavioral intent. Only the number of pounds intended to be lost in 6 weeks was used in the final analysis since all subjects indicated a very strong positive intention to lose weight. The behavioral criterion was actual weight loss. In the 79 subjects who completed the weight reduction program, the two predictive variables of the model when taken together were significantly correlated ($R = .38, p < .01$) with behavioral intention. The subjective norm measure was the significant predictor of behavioral intention with a beta weight of .28, where attitude = .16. Behavioral intention was significantly associated with absolute weight loss ($r = .44, p < .001$). Saltzer's study supported Fishbein and Ajzen's model and demonstrated the importance of social pressures and personal beliefs in the prediction of a health-related behavior (weight loss).

Smetana and Adler (1980) conducted a study of pregnancy tests to examine the relationship among attitude, subjective norm and behavioral intention of the Fishbein model and the effect of beliefs about alternative behaviors on intention and behavior with pregnancy test results. The subjects were 136 women awaiting results of a pregnancy test. In accord with Fishbein and Ajzen's strategies belief items and referents were generated from a literature review and from a representative sample of women who had had an abortion in the past and from pregnancy counsellors. The final questionnaire consisted of 54 belief statements describing an event that could occur as a result of

pregnancy or abortion. In path analysis, behavioral intention was regressed on four variables: beliefs about children, beliefs about abortion, normative beliefs and attitude toward abortion. Much of the variance in intention to have an abortion was accounted for by the components of the model ($R^2 = .57$). Subjective norm had the strongest effect on intention: the path coefficient was .463 ($p < .001$) while beliefs about the consequences of having a child exerted a noticeable yet less powerful effect: path coefficient was -.273 ($p < .001$). The path coefficient of the belief-attitude relationship was .499 ($p < .001$). For the 50 women whose pregnancy tests came out positive, the correlation between behavioral intention and behavior was .956 ($p < .001$); path coefficient was .961. In conclusion, data from this study supported Fishbein's model and demonstrated its usefulness for predicting both intention and behavior.

Riddle (1980) examined the beliefs, attitudes, and behavioral intentions of women and men toward regular jogging. Following Fishbein's specifications, Riddle obtained salient beliefs and referents from a sample of 40 joggers and non-exercisers. The final survey instrument was mailed to 296 respondents and returned. All subjects who returned a questionnaire were telephoned two weeks later to assess jogging behavior. The major test of Fishbein's model was whether or not the behavioral intention (to jog regularly) can be predicted from a linear combination of attitude and subjective norm measures.

Attitude and subjective norm when combined provided high prediction for the intent to jog ($R = .742$). The attitude measure proved to be a better predictor of intention to jog, $r = .643$; than the normative measure $r = .157$, both significant ($p < .05$). The intercorrelation between behavioral intent and behavior was .820. Riddle states that this model should be tested using other health-related behaviors inclusive of other types of exercise, to augment current understanding of human health behavior.

Bentler and Speckart (1981) assessed the causal structure of Fishbein's model to evaluate the causal predominance of attitudes over behavior. They assessed attitudes, subjective norms, intentions related to studying, exercising and dating in a sample of 158

college students. Structural equation analysis revealed that attitudes have causal priority over behaviors. Attitudes exerted a significant direct effect on all three behaviors while only one of the three behaviors had a significant direct effect on attitude. Intentions to study and date accurately predicted the behaviors while the intention to study most strongly correlated with subjective norm. A direct path was found between attitude and behavior. Bentler and Speckart concluded that attitudes cause behavior.

Bagozzi (1981a) employed a causal modeling methodology to examine key hypotheses within the context of two leading theories of the relationship between attitude and behavior, Fishbein and Ajzen expectancy-value model and Trandis, semantic differential model. Following Fishbein strategies, two independent samples of 50 subjects identified salient beliefs related to the behavioral criterion of donating blood. In one sample, respondents were asked to list their beliefs about the consequences that giving blood would have for them personally while the second sample listed their beliefs about the costs that giving blood would have for them personally. Using Liseral the results revealed that attitude influenced behavior only through its impact on behavioral intent. The relationship between attitude and intention was stronger when Fishbein's expectancy-value attitude measures were used as predictors than when Trandis' semantic differential measures were employed.

Bagozzi (1981b) also performed a quasi-experiment utilizing the same sample previously discussed ($n = 284$). Three groups of respondents were examined: those individuals who had never given blood; those individuals who had given before but in the distant past (2 months or greater); and those individuals who had given blood within the immediate past (20 minutes or less). The study determined the construct validity; the reliability; and the convergent, concurrent, discriminate, predictive and nomonological validities within the context of blood donation for expectancy-value and semantic differential measures of attitude. Both the Ajzen-Fishbein and Trandis models achieved convergent, concurrent, discriminate and predictive validity. The nomonological validity

of attitude remained questionable. The extent of past behavior and the elapsed time since performance of the behavior appeared to attenuate both the attitude-intention relationship and the intention-behavior relationship. Personal and social normative beliefs as co-predictors of intention were found to be insignificant. Fishbein and Ajzen's expectancy-value attitudes were found to occur as multidimensional responses indicating the impact of consequences of the act and the evaluation those consequences have on attitude while *Trandis* semantic differential attitudes were found to exist as unidimensional responses due to the global nature of the consequences of the act.

Two concepts related to the theory of reasoned action are the passage of time and the effect of past experiences. Vinokur and Ajzen (1982) examined the notion of these concepts as influencing factors in human judgement. Vinokur and Ajzen (1982) conducted two experiments which tested the hypothesis that earlier causes in a chain of events are credited with greater relative importance than later, more immediate causes. In the first experiment, 170 undergraduates judged the relative contributions to success or failure made by members of a team who initiated a problem-solution process versus team members who terminated it, representing prior and immediate causes. In the second experiment, 206 undergraduates rated the importance of prior and immediate causes of four varied situations, each of which involved two events that could have produced an important outcome. In both experiments, prior events in a causal chain were perceived to be more important than immediate events. In addition, the second experiment revealed that when one event is considered to make a greater causal contribution to an outcome than another event, the temporal or causal relationship does not change the perception of the relative importance. This experiment supported the fact that the causal primacy effect is not just a matter of the order in which prior and immediate events occur. Instead, it appears to be related to the perceived freedom of prior events that control and thereby appear to restrict the freedom of subsequent events.

Ajzen, Timko and White (1982) examined the role of individual differences as they impact on people's tendencies to act in accordance with their attitudes. "Self-monitoring" is a term frequently utilized to define the extent to which behavior is susceptible to situational or interpersonal cues. The behavior of high self-monitoring individuals is guided by situational factors with little correspondence between attitude and behavior, while the behavior of low self-monitoring individuals is guided by interpersonal cues with substantial correspondence between attitude and behavior. The effect of self-monitoring on the attitude-behavior relationship led to the following hypotheses. The researchers hypothesized that: (1) attitude towards a behavior predicted intention of both high and low self-monitoring individuals, (2) the relation between intention and behavior is stronger for low than high self-monitors, and (3) perceived behavioral relevance may mediate the relation between general attitude and specific behavior where low self-monitoring individuals are more likely to perceive the action implications of general attitudes than are high self-monitors.

A total of 155 undergraduates responded to three questionnaires over a six week period before and after the 1980 presidential election. The first questionnaire assessed self-monitoring tendency, the second questionnaire assessed attitudes and intention with respect to two behavioral criteria; voting in the election and smoking marijuana, and included self-reports of actual behavior. Two weeks after the presidential election participants were telephoned to assess behavior. The third questionnaire assessed attitudes toward smoking marijuana. Pearson-product moment correlations were computed between attitudes of high, moderate and low generality and the behavioral criteria. The sample of respondents were dichotomized at the median score forming high and low self-monitoring subsamples.

The findings supported the first two hypotheses. Low self-monitors tended to exhibit stronger attitude-behavior correlations than high self-monitors. There was, however, no difference in the prediction of intentions from attitudes, a finding that

refuted the perceived relevance of the effect of self-monitoring. Instead, the difference was located in the relation between intentions and behavior; low self-monitors exhibited significantly stronger intention-behavior correlations than did high self-monitors. The findings support the interpretation that the two types of individuals are equally aware of the implications of their attitudes, but that high self-monitors, being sensitive to situational demands, are less likely to carry out their previously formed intentions than low self-monitors, who are more attentive to internal cues. This study illustrated the value of measuring behavioral intentions as a variable that mediates between attitudes and behavior.

Kantola, Syme and Campbell (1982) applied Fishbein's model to household water conservation. Variables external to the model were included in the questionnaire to test the sufficiency of the model in explaining water behavior intentions to conserve water. The external variables were also used to examine the role of individual differences. The study was done on the western coast of Australia during a three-year draught. Thirty-nine subjects participated in a pilot study which determined consequences of conserving water during the ensuing summer. The six salient beliefs composed a section of the final questionnaire while the three normative beliefs questions were researcher determined. The behavioral intention measure was a Likert scale response to the statement "I intend to conserve more water this year than last year." The final questionnaire was given to 125 subjects attending the Perth Royal Show (State Fair).

In support of Fishbein's model, attitude and subjective norm were found to predict the intent to save water. Examination of correlations showed that subjective norm had the largest correlation with behavioral intention. Results also indicate that individual differences in age and sex played a significant role in intentions to conserve water. It must be noted that the subjective norm measure was not derived by Fishbein strategies yet achieved the largest correlation ($r^2 = .18$) with behavior intention.

Burnkrant and Page (1982) examined the convergent, discriminant and predictive validity of Fishbein's model in relation to blood donation. Two exploratory research studies provided the salient beliefs, salient referents and the 20 most discriminant items for the final questionnaire. The final questionnaire was administered over a 2 week period preceding the blood drive. Results from 124 respondents supported each component of the model as a determinant of behavioral intention. Predictive validity of the constructs was supported although behavioral intention to donate blood was found to be primarily under attitudinal control. Convergent and discriminant validity were supported where attitude and subjective norm were found to be separate, unidimensional but correlated constructs. In general, the results support a simpler model than the current Fishbein (1975) model, in which a single attitude construct and a single normative construct are antecedents of intention.

Ryan (1982) investigated the theory of reasoned action as a framework for marketing research. Ryan proposed a general model more complex than Fishbein's, yet consistent with its conceptual underpinnings. Ryan's model proposed behavioral intentions are formed from interdependent yet separate attitude and normative variables. This study utilized an experimental design to examine the effects of cognitive and normative information on intentions to use brand O toothpaste. Eighty respondents from various church groups provided salient beliefs and referents relevant to the purchase and usage of toothpaste. The elicited beliefs and referents were used to construct the final questionnaire in which the behavioral intention was the use of a fictitious new brand of toothpaste. Ryan manipulated the cognitive and normative information in four forms of a booklet given as part of the final questionnaire to assess his expectations. The use of Liserl provided the relative strength of the paths between variables. Results indicated behavioral intention is a function of complex interdependencies among attitudes and subjective norms. The subjective norm measure more strongly mediated between the

experimental effects of cognitive and normative information on intentions than did the attitude measure.

Manstead, Proffitt and Smart (1983) examined the applicability of Ajzen and Fishbein's theory of reasoned action to the prediction and understanding of infant feeding. This study proposed two distinct theoretical advantages: (1) in the context of adult behaviors it is unusual for primiparous mothers to choose and use a method of infant feeding and (2) prenatal intentions cannot reflect past behavioral experience. Salient belief statements and social referents were not derived according to Fishbein and Ajzen but were derived from a study conducted by the British government in 1975. Twelve salient beliefs and four salient referents were used in the study.

One hundred twenty-three primiparous and 127 multiparous mothers were given the predictive questionnaire during prenatal clinic visits. Each group was sent a second questionnaire 6 weeks after the birth of the baby. Results of the study were based on 215 completed questionnaires of which 106 were the primiparous test group. This study utilized a control group in which 85 primiparous mothers completed only the follow-up questionnaire. Behavioral intention was assessed using a seven point scale. The follow-up questionnaire elicited prenatal intentions and post partum infant feeding behavior used in seven specific stages (in hospital through weeks 1 through 6) of the baby's life. Infant feeding behavior was measured dichotomously. A score of 0 was given the mothers who never breast-fed their babies while a score of 1 was given to mothers who had breast-fed their babies at some point in time during the 6-week postpartum period.

Behavioral intention and behavior were strongly related ($r = .82$). Using multiple regression, the attitude and subjective norm measures were found to exert equal influence on behavioral intention in primiparous mothers. The attitudinal component of behavioral intention was weighted more heavily for multiprimiparous mothers than for primiparous mothers. Chi-square analysis revealed that the control group of mothers did not differ significantly from that of the primiparous test group. As a secondary aim of the study,

the Zuckerman and Reis (1978) "time interval" hypothesis was tested. This hypothesis assessed the attitude-behavior relationships of mothers with differing intervals between the measurement of predictor variables and the measurement of behavior. The Zuckerman-Reis "time interval" hypothesis predicts that mothers with long intervals between the assessment of predictor variables and the assessment of behavior will be more likely to display a direct relationship between attitudes and behavior (Manstead et al., 1983, p. 659). Results for this hypothesis indicated for the short delay group (less than 25 day interval), the attitude-behavior correlation was .64 while the intention-behavior correlation was .83. The corresponding correlations in the long delay group (25 day or longer interval) were .71 and .81. The length of delay did not significantly alter the correlations. Understanding why some mothers breast-fed and yet others bottle-fed required analysis at the behavioral belief level. The two groups were found to differ significantly on all six behavioral beliefs about breast feeding and differed on three of the six beliefs about bottle feeding. This study suggested Fishbein's model worked well within the behavioral domain of infant feeding intentions and behaviors for British mothers.

Wittenbraker, Gibbs and Kahle (1983) conducted a longitudinal study of seat belt usage utilizing Fishbein and Ajzen theory and guidelines. The construct of habit was also tested within this context to assess behavior that is not wholly volitional but typically enacted. One hundred thirty-four subjects enrolled in an introductory psychology course responded to two identical questionnaires separated by a 1 month time interval. The questionnaire consisted of essentially the relevant Fishbein and Ajzen measures with the addition of a frequency measure regarding the specific behavior and a social desirability scale. The dependent variables consisted of the frequency of riding in or driving in a car. The researchers analyzed the data using multiple regression and cross-legged panel correlation. The regression results supported the theory of reasoned action. Attitudes and subjective norms predicted intentions, and intentions predicted behaviors; habits, too,

predicted behavior. The cross-legged results affirmed the cycle of influence from subjective norm to intention to attitude and back to subjective norm, implied that each of these variables plays a legitimate, important role in the use of seat belts.

Originally, the Fishbein model (1967) included perceived moral values as a third measure of behavioral intention. This measure was eventually removed from the model by Ajzen and Fishbein (1970) because moral obligation was discovered to serve as an alternate measure of behavioral intention.

Gorsuch and Ortberg (1983) hypothesized that a measure of perceived moral obligation would add significantly to the predictive power of attitude and social norms in moral situations but not in non-moral situations. Four hypothetical situations, two in which morality was relevant and two in which it was not, were used in the study. The four situations were: an erroneous tax refund; working on Sundays (unable to attend church); attending a party (unable to attend early worship next day); and, second church service (too tired to attend early worship). One hundred thirteen subjects from an adult Sunday school class of a Baptist church responded to statements developed to assess attitude, subjective norm, perceived moral obligation and intention. The moral obligation component significantly predicted behavioral intentions in the morally relevant situations while attitude was significant for predicting just one of the non-moral relevant situations. The findings of this study suggested that a measure of personal moral obligation is a necessary component of the Fishbein Ajzen (1980) model to predict behavior intentions in moral situations.

Fredricks and Dosset (1983) compared Fishbein and Ajzen's (1975) model of attitude-behavior relations with Bentler and Speckart's (1981) modifications of the model for differences in predictive power between the models. Bentler and Speckart's expanded version of Fishbein and Ajzen's model proposed: (1) attitude directly effects behavior in addition to indirectly influencing behavior by virtue of its influence on intention and (2) the addition of previous behavior to the model. Previous behavior is postulated to effect

both current intentions and future behavior. These effects were not predicted by the original Fishbein and Ajzen model.

Adhering to Fishbein and Ajzen (1980) format, Fredericks and Dosset (1983) conducted a pilot study on 123 summer school students in psychology and determined modal beliefs and significant others in relation to the consequences of the specific behaviors: class attendance/absence. Modal beliefs are salient beliefs for a representative population. Eleven modal categories, seven modal consequences of attending class and four modal consequences of being absent were identified for the primary study questionnaire. The primary study used a different sample of nine, 5-week summer school classes. Two hundred thirty-six subjects completed the final questionnaire. The behavior, class attendance or absence was assessed by signature on class attendance sheets. Prior behavior was indexed by attendance/absence data collected for 2-weeks prior to the midpoint of the summer session. A semantic-differential questionnaire assessed attitudes, subjective norms and behavioral intention between weeks 3 and 4 of the summer session. Behavioral intention was assessed by two questions regarding intention to either attend or be absent from class during the final two weeks of the summer session. Data analysis was done using Liseral IV. The results supported Bentler-Speckart's (1983) hypothesis that there is a direct path from prior behavior to both intention and target behavior but Bentler and Speckart's hypothesis that there is a direct path from attitude to target behavior was not supported. This study is significant because its conclusions can be applied more broadly. The basic interrelationships between variables in the Fishbein and Ajzen formulation apply to industrial, governmental and service organizations where attendance behavior is of interest.

Pagel and Davidson (1984) compared the predictive utility of three expectancy-value models toward contraceptive behavior. Each of the models: Rosenberg, Fishbein and Beach is designed to predict a predisposition to behave in a certain way. Depending on the specific model, predisposition can be viewed as a behavioral plan, a choice or as

an attitude (Rosenberg model, attitude; Beach model, behavioral choice; Fishbein model, attitude or behavioral plan) the models were compared in terms of the criterion variables. The researchers also tested the specificity hypothesis, which states that a predictor and criterion are defined by action, target, context, time and there is correspondence between each pair of elements. To evaluate the predictive utility of attitudes, within-versus across-subjects prediction of contraceptive behavior was used. Each model was put into operation according to each theorist's specifications. Seventy female psychology students completed a questionnaire which assessed attitudes toward, beliefs about, and intentions to use either oral contraceptives, a diaphragm or natural methods. The questionnaire operationally defined the components of each model through scales that reflected the particular model's dimensions. Thus, scales were developed to assess the instrumentality and value components of the Rosenberg model, the Fishbein's model and the Beach model. The dependent variables were self-reported measures of attitudes and behavioral plans regarding the designated contraceptive behaviors. Pagel and Davidson analyzed their data using stepwise regression. All three models exhibited significant predictive utility for behavioral intention. Personal normative beliefs emerged as a strong independent predictor of behavioral plan. As hypothesized, the "within-subject" procedure yielded greater predictive accuracy than the "across-subject" procedure for the Fishbein and Beach models with no clear pattern of predictive superiority between them. The results of the specificity hypothesis revealed that each model made its best linear predictions of attitude toward the behavior when correspondence between elements was demonstrated, however, as attitudes became less specific for behavior predictability decreased.

Schifter and Ajzen (1985) examined the use of attitudinal and personality variables as predictors of success in attempted weight reduction. The study was based on the theory of planned behavior (Ajzen, 1985; Ajzen & Timko, 1986) which extends the theory of reasoned action to include non-motivational determinants of behavior (requisite

opportunities and resources). As in the original model, the prime concern is the individual's intention to lose weight. This intention is said to be a function of three independent variables: attitude, subjective norm and perceived control over one's body weight. This theory, through perceived control, takes into account some of the realistic constraints that exist regarding weight reduction.

Schifter and Ajzen (1985) hypothesized that: (1) intentions to lose weight can be predicted from attitudes, subjective norms and perceived control; (2) intentions and perceived control should permit prediction of actual weight loss, and (3) individuals who score high on variables related to actual control (perceived competence, ego strength, action control, health locus of control) are expected by others to be better able to carry out their intentions to lose weight. The major focus of this study was on the extent to which individuals made detailed weight reduction plans and examined a number of individual difference variables. Eighty-three college students expressed their attitudes, subjective norms, perceived control, and intentions with respect to losing weight. The study was conducted during two stages of the spring semester. Stage 1 assessed attitudes, subjective norm, intentions, and perceived control. Six weeks later, 76 of the same subjects responded to a Stage 2 questionnaire which assessed individual differences. In support of the theory of planned behavior, intentions to lose weight were accurately predicted on the basis of attitudes, subjective norms and perceived control; perceived control and intentions when taken together, predicted fairly successfully the amount of actual weight loss over the 6-week period and perceived control was the best of five predictor variables of actual weight loss. The individual difference variables: self knowledge, planning, and ego strength, revealed a significant correlation with weight loss. Hierarchical multiple regression analysis was performed to examine the total amount of variance in weight loss that could be explained by considering all factors that were found to have significant relations with weight loss. Intention and perceived control (Variable 1) and self-knowledge, planning and ego strength (Variable 2) alone did not

make a significant contribution, yet their simultaneous effect was highly significant: $F(6,67) = 3.73, p < .01$.

Ajzen and Madden (1986) tested the theory of planned behavior in two experiments with college students. Perceived behavioral control is specific to the theory of planned behavior. Underlying perceived behavioral control is a set of beliefs that deal with the presence or absence of requisite resources and opportunities. These beliefs are also presumed to determine intention and behavior.

Similar to Fredricks and Dossett's (1983) study on class attendance, Ajzen and Madden (1986) assessed attitudes, subjective norms, perceived behavioral control, and intentions in two experiments on class attendance and the goal of obtaining an "A" in a course. In the first experiment 169 undergraduates' attendance at class lectures was recorded over a 6-week timeframe. Attendance data was collected at 16 regular class sessions. The questionnaire, designed to obtain a measure of the constructs within the theory of planned behavior, was administered eight sessions into the semester. The number of sessions attended during the first and second eight-week periods served as measures of prior and later behavior. The perceived behavioral control measure was developed in a pilot study. Twenty-four college students listed factors which could prevent them from attending class, frequency of occurrence, and the degree to which they felt in control of attending all class sessions. Consistent with the theory of planned behavior, perceived behavioral control greatly improved the models predictive power ($F = 46.16, p < .01$) in comparison to attitude and subjective norm only.

In the second experiment, 90 undergraduates participated in an experiment where the behavioral goal was getting an A in a course. As with the first experiment, perceived behavioral control added significantly to the prediction of intentions, independent of attitude and subjective norm.

Bagozzi (1986) presented an alternative expectancy-value model, derived from Fishbein and Ajzen (1975) formulation, and compared the alternative model with the

traditional formulation found in the theory of reasoned action. Bagozzi focused upon attitude formation, specifically upon evaluations. He argues that neither a moral nor an affective evaluation is sufficient to capture the motivational component of the original model. Bagozzi then proposed a re-conceptualization based on subjective conditional approach/avoidance reactions where an individual appraises the consequences of his or her actions. These appraisals are hypothesized to represent approach/avoidance reactions. These approach/avoidance reactions are hypothesized to be the results of affective evaluations, moral evaluations, and other psychological processes.

Following Fishbein and Ajzen (1980) strategies, Bagozzi (1986) elicited 12 salient beliefs about the consequences of the act of donating blood from 40 respondents. The final questionnaire assessed attitude, beliefs, evaluations, and subjective approach/avoidance responses. Two independent samples of 110 respondents were randomly selected and separated into an experimental group and a control group. The subjects were male students at the University of Saarland in Germany. The experimental manipulation for those donating blood consisted of viewing a series of slides of a person giving blood. Hierarchical regression was the method of data analysis chosen to test the hypothesis concerning the multiplicative combination of beliefs with either evaluations or approach/avoidance responses. It appeared that neither moral evaluations nor affective evaluations combine multiplicatively with beliefs to predict attitudes. Bagozzi's re-conceptualization with approach/avoidance evaluations were found to combine with beliefs to account uniquely for variation in the attitude criteria (Bagozzi, 1986).

Fishbein and Ajzen (1975) inferred that external variables such as personality traits influence behavior indirectly by affecting attitudes, social norms, or the weights placed upon these components. Miller and Grush (1986) examined certain dispositional variables that might moderate the relationship between attitudes-behavior and subjective norm-behavior. The study predicted that individuals who are both aware of their own attitudes and unconcerned with the opinions of others would display high attitude-

behavior correspondence. Also, it was hypothesized that individuals with other combinations of these personality traits (high and low) were expected to display high norm-behavior correspondence. The subjects studied were 226 students enrolled in an introductory psychology course. The subjects completed a self-consciousness scale and a self-monitoring scale to assess individual differences in relation to the attitude-behavior, norm-behavior relationships. Following Ajzen and Fishbein (1980) guidelines, Miller and Grush distributed questionnaires to assess social norms, attitudes and behaviors with respect to spending time on school work. To create an overall behavior index, they developed a summed scale of eight academic activities in which students might have engaged in that semester. Hierarchical regression analysis supported both hypotheses. The study clearly revealed the joint effects of dispositional variables to provide a more adequate account of the attitude-behavior relationship.

Ajzen and Timko (1986) examined the relationship between health attitudes and behavior. These authors articulated the principle of correspondence, which posits that specific health behaviors are likely to correlate only with equally specific attitudes towards those behaviors. This same principle can also be applied to perceived control, where measures of perceived control over specific preventive health behaviors are expected by researchers to facilitate relatively accurate prediction of corresponding actions. This study also considered other factors related to matters of health: perceived vulnerability to illness, perceived harmfulness of illness, concern about illness, and perceived effectiveness of recommended health practices.

In a pilot study, 40 undergraduate students responded to how frequently they performed specific health behaviors. Item analysis revealed 24 of the 53 common behaviors correlated .40 or greater with the total score; these behaviors were selected for further examination. In the subsequent expanded study, 113 undergraduates completed a questionnaire that assessed attitudes and general beliefs about health and illness, and specific beliefs regarding the 24 health-related behaviors. The frequencies regarding how

often each behavior was performed generated single-act criteria and were used to construct an aggregate measure of health behavior. The results demonstrate the importance of correspondence between measures of independent and dependent variables. Attitudes and perceived control with respect to specific health-related actions correlated highly with corresponding behaviors, yet global attitudes toward generally recommended health practices and general beliefs regarding health locus-of-control were found to account for little variance in specific health behaviors. Perceived control over specific health related actions exhibited strong relations to self-reports of corresponding behaviors. This study also found that health behavior was predicted with greater accuracy from an affective than from an evaluative measure of attitude.

The construct, behavioral intention, of Ajzen and Fishbein's model (1980) continues to be a questionable variable. Behavioral intention is defined as a person's subjective probability that he or she will engage in the behavior of interest. Azjen and Fishbein (1980) posit that the correlation between behavior and behavioral intention should be high. This high correlation has been found by Pomazal and Jaccard's (1976) study of blood donation, Jaccard and Davidson's (1972) family planning work, Fishbein and Coombs (1974) study of voting, DeVries and Ajzen's (1971) cheating in college work, and Holman's (1956) study of attending football games.

However, Fishbein (1972) inferred several factors may weaken the obtained intention-behavior relationships (e.g., the specificity of the intentional measure, the length of time between the measurement of intention and the observed behavior, the degree to which carrying out the intention depends on others or the occurrence of particular events, lack of or partial correspondence between the elements [action, target, context and time] of the theory's constructs). There appears to be evidence that the mediating role of behavioral intention may be artifactual. In a study of blood donation, Zuckerman and Reis (1978) found a direct contribution of attitudes to predicting blood donation behavior without the mediating role of behavior intention. Social norm's effect

in predicting blood donating behavior was derived from the mediating role of intentions, while attitudes retained a direct, non-mediated influence on behavior. Bentler and Speckart (1981) in a study of three behaviors of college students found that attitude exerted a significant direct effect on the behavior of studying. The other two behaviors revealed intention predicted dating but not exercise. Manstead, Proffitt and Smart (1983) studied infant feeding behavior. More specifically, this study examined the Zuckerman - Reis hypothesis that the longer the interval between the expression of behavioral intent and behavior, the weaker the relationship between intent and behavior, and the stronger the relationship between attitude and behavior. No statistical difference was noted, yet the pattern was consistent with the hypothesis. Fredricks and Dossett (1983) compared Ajzen and Fishbein's model (1975) to Bentler and Speckart's (1981) expanded version of that model to include prior behavior and a direct path from attitude to behavior. The results did not support a direct path from attitude to the behavior of class attendance.

In summary, few studies suggest that the effect of attitudes on behavior is not completely mediated by behavioral intentions. These studies cast doubt on this construct of Ajzen and Fishbein's theory (1980). As Liska (1984) noted the independent effect of attitude is often substantial; sometimes stronger than the indirect effect mediated by behavioral intentions, and then sometimes even stronger than the independent effect of intentions. This study intends to address the predictive efficiency of the direct and indirect measures of attitude and subjective norm to behavioral intention and subsequent behavior. The mediating role of behavior intention will be assessed.

This section summarized the review of the literature for Ajzen and Fishbein's (1980) theory of reasoned action. Twenty-nine studies were reviewed. The studies reviewed were conducted between the years 1970 and 1986. Six of the studies were laboratory investigations while all other studies were field investigations. All studies tested either one or all constructs of the theory of reasoned action. Specifically, the constructs tested took the form of: behavioral intention as a function of attitude and

subjective norm; attitude as a function of beliefs about consequences and evaluation of consequences; and attitude and subjective norm as predictors of behavioral intention.

Four studies examined the impact of "other variables" on the theory of reasoned action. These variables are: the role of dispositional variables; external variables; the variables of time and past experiences; and the variables of individual differences. Three studies examined the validity of the Ajzen and Fishbein model (1980) while two studies compared the theory to other predictive behavioral models. All studies reviewed followed Ajzen and Fishbein's strategies for questionnaire construction except studies which stated their rationale for altering the development of the questionnaire. Of the 29 studies reviewed, subjects were college students with the exception of nine studies. Sample size ranged between 73 and 296 with the exception of Fishbein and Coombs (1974) political election survey.

Data analysis for the studies reviewed utilized multiple regression procedures, structural equation modeling or path analysis. Behaviors examined in the context of Fishbein and Ajzen's model (1980) were health-related behaviors, business-related behaviors and public-interest behaviors. Six current studies examined expanded modifications of the theory of reasoned action. These studies extended the theory of reasoned action by adding another variable in an effort to further understand and explain human behavior.

The findings of this section of the literature review are as follows: a significant relationship exists between behavioral intent and behavior, according to all studies that examined these variables; both the attitude and/or subjective norm measures significantly predicted behavioral intention in all studies reviewed; and the theory of reasoned action is a valid theoretical formulation.

Exercise Research

In recent years, exercise has become an integral part of the rehabilitation process for both the post myocardial infarction patient and the coronary-artery-bypass-graft patient. The physiologic and psychological benefits of an exercise program have been well researched. However, few studies have examined what determines participation in a cardiac rehabilitation exercise program.

Tirrell and Hart (1980) examined the relationship of health beliefs and knowledge to exercise compliance in patients after coronary-artery-bypass surgery. These authors used the health belief model (HBM) as a framework to examine health beliefs of this patient group.

Thirty coronary-bypass patients participated in a teaching program to evaluate its effect on long-term compliance to exercise. The teaching program consisted of an individualized exercise regimen, how to obtain target heart rate and to maintain an activity log. Six to eighteen months after surgery patients participated in a interview survey. The results of this study revealed a low compliance rate with the specifics of the heart-walk exercise regimen. Perception of barriers was the variable that showed the strongest relationship with walking compliance. The greater the number of perceived barriers the lower the compliance level. The perception of susceptibility with the walk-regimen revealed an inverse relationship, those who perceived themselves as most susceptible were least compliant. Specific barriers to compliance were weather and short bouts of acute illness. This study did not report statistical results, only global findings.

The use of the health belief model in Tirrell and Hart's (1980) study provided minimal information regarding the health beliefs of post-coronary -artery -bypass graft patients. Muench (1987) also used the health belief model to examine health beliefs regarding a cardiac rehabilitation program with bypass patients and post myocardial infarction patient's overtime. Seventy-two patients completed a questionnaire regarding health beliefs, perceived self-efficacy of exercise and other risk factors, and health

motivation. Patients were also asked to list, in an open format, the benefits and barriers of a cardiac exercise program. The results of this study indicated subjects who perceived benefits of the exercise program had higher levels of general health motivation and self-efficacy ($r = .55, p < .001$) while subjects who perceived more benefits of exercise noted fewer barriers to attendance ($r = .22, P = 0.31$). Three benefits were reported regarding a cardiac rehabilitation program: improved stamina, medical supervision and regular participation in a scheduled exercise program. Three barriers were noted: early morning schedules, conflict with other activities, and transportation. The health belief model as a conceptual framework is useful but limited by its constructs to elicit health beliefs of a specific situation.

Other studies involving cardiac patients have focused on factors associated with participation and adherence to exercise. Oldridge and Jones (1983) examined the effect of a written agreement on compliance in a cardiac rehabilitation program. Patients were asked to sign an agreement to comply with the program for 6-months and to keep a diary of self-monitored heart rate, daily physical activity and weight changes and smoking habits. One hundred twenty subjects with coronary heart disease participated in the study. Of the 120 subjects, 51% were classified as dropouts within 6-months. A 42% compliance rate resulted for the control group while a 54% compliance resulted for the experimental group. These compliance rates were not statistically significant ($P > .10 < .20$). However, 15 of 63 experimental subjects refused to sign an agreement. The compliance rate for those who agreed to participate for the 6-months was 65% higher than it was in those experimental group subjects who did not sign the agreement (20%) ($P < .005$) and higher than the compliance rate in the control group (42%) ($p < .01$). Factors significantly associated with dropout in both groups were blue collar work, smoking at entry, inactive leisure habits and a younger age. The compliance rate for self-monitoring was 77% of 31 experimental subjects and 52% for daily physical logs.

Mirotznik, Speedling, Stein and Bronz (1985) examined specific characteristics (physical fitness, beliefs and attitudes) of those who join and adhere to a cardiovascular fitness program and those who do not. These authors conducted their study on 215 people who came to a Coronary Detection and Intervention Center for a coronary heart disease (CHD) risk assessment with the opportunity to enroll in an exercise fitness program. The non-joiners were those individuals ($N = 154$) who underwent the risk assessment and exercise electrocardiogram (EKG) only. The joiners ($N = 61$) were those individuals who enrolled in the fitness program. Both groups were compared in terms of: sociodemographic and physical characteristics, fitness, CHD risk factors, self-assessed health, and general health attitudes and behavior. Using both chi-square and t-test the following were noted. Joiners were older, more likely to be retired or working part-time and 41% had graduate degrees. Significant differences were noted with regard to fitness variables, CHD risk assessment and health attitudes.

In the final analysis, three variables were able to differentiate joiners from non-joiners. In order of explanatory importance, the three variables were: number of minutes on the exercise EKG protocol (.366, $p .002$), worry or concern about health (1.318, $p .035$), and the belief that improved health would lead to increased activity (1.475, $p .045$). More specifically, joiners and non-joiners had different health attitudes. Joiners worried more about their health and viewed improved health as important in other areas of life. Health beliefs were not found to affect adherence significantly.

Other investigators have focused attention on the relationship between attitude and exercise behavior. Godin and Shephard (1986b) compared Ajzen and Fishbein's (1980) concept of attitude with Kenyon's attitude inventory toward intentions to exercise. Simple Pearson coefficients were computed between pairs of the measured variables. Stepwise multiple regressions were performed, predicting the intention to exercise from, (1) Ajzen and Fishbein's attitude and subjective norm constructs, (2) Kenyon's subdomains, and (3) a combination of Ajzen and Fishbein and Kenyon's subdimensions.

The results indicated intentions to exercise correlated greater with Ajzen and Fishbein's attitude than with any of the other measurements. The cumulative R^2 for attitude and subjective norm was 0.308. Attitude being the only variable to carry a significant beta weight (0.448, $p < 0.001$). Kenyon's inventory yielded a cumulative R^2 of 0.109, where the health subdomain carried the only significant beta weight (0.226, $p < 0.05$). The third multiple regression, combining both Ajzen and Fishbein and Kenyon's subdomains yielded a cumulative R^2 of 0.308 with the attitude construct to carry the only significant beta weight (0.448, $p < .001$). The results of this study support the notion that attitudes defined specifically according to Ajzen and Fishbein are more strongly related to intentions than general attitudes toward an object as defined by Kenyon.

In yet another study, Godin, Desharnais, Joben and Cook (1987) investigated the effect of two persuasive techniques to modify: (1) intention to exercise with and without knowledge of the results of a fitness test and health appraisal, and (2) intention and behavior to exercise over 3-months. Ajzen and Fishbein's methods (1980) were used to determine intention to exercise. Subjects were randomly assigned to one of four experimental conditions either with or without knowledge of test results: (1) physical fitness test, (2) appraisal of health, (3) fitness testing and health age combined, and (4) no treatment-control.

Of the 250 subjects, the final sample consisted of 140 subjects. An analysis of variance revealed the following: to complete one or both tests had no significant immediate effect (without knowledge of results) on the intentions to exercise during the next 3-months ($F = 4.01$, $P < .01$). With knowledge of results, the intention of the fitness test and fitness test plus health appraisal groups differed significantly from the control group. However, 3-months later, no significant difference in intentions remained between the groups ($F = 0.70$).

Investigators continue to search for factors relevant to an individual's decision to initiate and maintain regular physical exercise. Dzewaltowski (1989) compared

Bandura's social cognitive theory and Ajzen and Fishbein's theory of reasoned action (1980) to predict exercise behavior. Both theories conceptualize determinants of behavior but differ with respect to the variables and their causal relationship with each other. A questionnaire consisting of both theories constructs and an exercise log was completed by 328 undergraduate students in a physical education skills class. The results of this study supported the theory of reasoned action where direct attitude and subjective norm correlated significantly with indirect attitude and subjective norm (.584 and .677) respectively. Contrary to the theory, a weak but significant path was noted between indirect attitude and direct subjective norm (.123). Only direct attitude was a statistically significant predictor of behavioral intention with a path coefficient of .508. The theory of reasoned action explain 5% of the exercise behavior variance. Two social cognitive theory variables, self-efficacy and self-evaluated dissatisfaction, significantly predicted exercise behavior (23.8, 7.91) respective beta weights. Social cognitive theory variables accounted for 10.8% of the variance in exercise behavior. Also a multiplicative function of self-evaluated dissatisfaction and outcome expectations increased the amount of predicted exercise behavior variance to 16%. Finally, hierarchical regression analyses determined that the theory of reasoned action did not account for any unique variance in exercise behavior that the social cognitive theory variables did not explain, R^2 change = .006, F change < 1.

Many studies have applied attitude-behavior models to examine exercise behavior. Godin and Shepard (1990) provide an extensive overview of the main attitude-behavior models that have been used to analyze exercise behavior. Among the models discussed, the health belief model (HBM) was reviewed in terms of existing empirical data. More specifically, since the HBM is concerned with perceptions of illness, it has been applied to study exercise behavior in patients with ischemic heart disease. Of three such studies (Holm et al., 1985; Muench, 1987; Tirrell & Hart, 1980) the results were

ambiguous and contradictory (Godin & Shepard, 1990). This existing data provided no clear indication that the HBM is appropriate for the study of exercise behavior.

The protection motivation theory of Rogers is similar to the HBM with the focal point as motivation to protect oneself. The model has limited usefulness when studying exercise behavior (Godin et al., 1983, 1987). However, the addition of the self-efficacy concept to this model and the HBM has revealed positive findings.

Bandura's social cognitive theory has been successfully applied to exercise behavior (Sallis, Hovell, Hofstetter, Faucher, & Elder 1989). The perceived ability to participate and to exercise regularly in a supervised exercise program appears to be the variable of prime importance (Godin & Shephard, 1990). Ajzen and Fishbein's (1980) theory of reasoned action has also proved to be a very successful model toward the understanding of the decision-making process that underlies exercise behavior. Of 22 studies using Ajzen and Fishbein's model reviewed by Godin & Shephard (1990), 13 reported a substantial (30%) amount of variance in intentions to exercise explained by the persons attitudes. The subjective norm construct is less consistently associated with intention toward exercise. The effect of external variables and past behavior may influence intention independent of the theory's constructs (Valois, Desharnais, Godin, 1988).

Triandis's theory of interpersonal behavior has been successfully applied to some health-related behaviors. This model supplements the theory of reasoned action with the concepts of role beliefs and person normative beliefs. Studies using this model have found the effect of past behavior and the affective attitude dimension to be important determinants of intention and exercise behavior.

Finally, Ajzen and Madden (1986) added the construct of perceived behavioral control to the theory of reasoned action and extended the theory which is entitled theory of planned behavior. Few studies have investigated the theory of planned behavior toward health-related behaviors.

The HBM and protection motivation theory say health-related behaviors are understood in terms of their specific potential to protect against disease or to optimize health, while all other attitude-behavior theories analyze behavior in terms of social dimensions. The variables, expectations of self-efficacy, attitude toward exercising, perceived barriers, and past behavior all exert strong influences upon intention and behavior (Godin & Shephard, 1990).

Dzwaltowski, Noble and Shaw (1990) examined social cognitive theory and the theories of reasoned action and planned behavior in terms of physical activity participation. The subjects were 254 undergraduates enrolled in a concepts-of-physical-education course. The students completed two questionnaires, one operationally defined for the specific theory, and the second, a seven day recall instrument which measured physical activity participation. The results of this study revealed attitude and perceived behavioral control predicted intention to participate in physical activity. The regression coefficients for the theory of reasoned action were attitude beta weight (b) = .40 and the theory of planned behavior, attitude b = .33, perceived behavioral control b = .30, predicting intention. Intention predicted physical activity b = .32 for both theories. Self-efficacy and self-evaluation of the behavior significantly predicted physical activity participation (b = .23, b = -.21). Hierarchical regression analyses indicated perceived control and intentions did not account for any unique variation in physical activity participation over self-efficacy.

In summary, social cognitive theory and the theories of reasoned action and planned behavior, are among the most useful frameworks to study exercise behavior. Attitude-behavior models serve to understand the decision-making process that underlies and precedes an action (Godin & Shephard, 1990). Of these theories, an individual's predispositions are of central concern. In an attempt to uncover the post myocardial infarction patients' predispositions toward a cardiac rehabilitation exercise program, the theory of reasoned action was applied because of its ability to qualitatively uncover

patient beliefs regarding a cardiac rehabilitation program and to link these beliefs to exercise behavior.

Nursing Research: General

The theory of reasoned action has been applied or cited in nursing research since approximately 1981. The model's utility to patient and nurse situations has been demonstrated. This section of the literature review will first review general nursing research employing and/or testing Ajzen and Fishbein's model (1980). The second section will focus on specific cardiac nursing research which utilized this model over a period of twenty years. Also, two studies that address entrance into a cardiac rehabilitation program will be reviewed.

The theory of reasoned action was tested in an examination of nurses' charting behavior. Schmidt's (1981) study tested the utility of the Fishbein model in nursing. The study also examined a specific intervention designed to change nurses' attitudes toward charting behavior. The quality assurance framework of the American Nurses Association specifies that designated criteria need to be identified for each patient population to be audited. The patient population for this study was myocardial infarction patients. The study's treatment which was designed to create a positive attitude consisted of nurses participation in the development and revision of patient outcome criteria. The subjects were 16 nurses employed on a post coronary care unit of a private hospital. A pre-post experimental design with a single treatment effect was used to assess attitudes, personal and social norms and motivation to comply. Schmidt conducted a retrospective chart audit, during the pre-post treatment Phase, to determine nurses' charting behavior. Three semantic differential scales were used to measure attitudes toward charting as well as personal and social norms with regard to charting. Two Likert-type scales measured motivation to comply with personal and social norms. The study's negative findings may be attributed to a variety of factors with emphasis on the lack of Fishbein and Azjen

strategies to first determine beliefs, attitudes, subjective norms and intentions toward charting behavior. Specifically, instrument validity for post-test data had a Cronbach's alpha reliability of 0.00 which may have accounted for the lack of support of Fishbein's model. The study's results failed to report a strong relationship between subjects' attitudes and their behavior. The first hypothesis which stated the behavior prediction coefficient for pretest charting of outcome criteria will not differ significantly from zero was not rejected. Motivation-social and nursing service guidelines correlated significantly with the audit score for pretest data ($r = .62, p < .01$). In the pretest audit scores, 45% of the variance was accounted for by ideal nurses' notes (personal norm), nursing service guidelines (social norm), and nursing notes (attitude). The second hypothesis dealt with the behavior prediction coefficient for posttest charting of outcome criteria and revealed no significant correlation among the three variables and the audit score. The third hypothesis resulted in a one-way chi-square ($\chi^2 = 2.22, df = 1, p = .13$) which indicated no significant difference using the total number of criteria charted for all subjects prior to and following treatment. No significant differences were found in attitude scores of the pre and posttest Phases.

Davidhizar (1982) utilized Fishbein's expectancy-value model (Fishbein, 1963, Fishbein & Ajzen, 1975) to develop a tool for profiling the attitude of schizophrenic clients toward their medication. Fishbein's expectancy-value model modifies the theory of reasoned action by considering only three major concepts: belief, evaluation and attitude. Davidhizar carefully considered the mechanisms of the model to elicit the desired data from the schizophrenic patient population. Ajzen and Fishbein (1980) identify open-ended solicitation of beliefs or an alternative fixed-response format, where fixed responses are obtained from a sample of the population or from a review of the literature, all three may be used to elicit beliefs. Davidhizar simplified the mechanism to obtain the strength of belief and the evaluation of beliefs for use with the client suffering

from schizophrenia. Davidhizar developed an open-ended tool and a fixed-response tool to profile the attitudes of in-patient schizophrenics' toward taking medications.

Davidhizar, Austin and McBride (1986) then employed Davidhizar's (1982) open-ended and fixed-response tools to assess the attitude of patients with schizophrenia toward taking medication. The subjects were 50 patients hospitalized in an acute-care psychiatric unit for schizophrenia. Each patient responded to three measures: an open-ended attitude measure with a simplified belief strength component, a fixed-response measure with 24 belief statements, a simplified belief strength component, and a 10-item insight measure designed to obtain the patient's insight into illness and treatment. Results of this study indicated a wide range of attitudes toward taking medications. The open-ended measure elicited 198 beliefs. The sum attitude measure revealed the average patient attitude was neutral, since positive and negative perceptions cancelled each other out. Negative beliefs accounted for 53.5% of the findings and were related to physiological effects such as dry mouth, dizziness, leg aches, stiff joints, etc. Positive beliefs accounted for 17% of the findings and involved psychological effects such as feel like yourself again, feel calm and relaxed etc. The fixed-response instrument produced an attitude score of 0 for most respondents, again depicting a neutral attitude about taking medications. The Pearson correlation coefficient for the two attitude instruments was .71 ($p < .001$) and accounted for 54% of the variance. The insight into psychiatric illness measure essentially revealed that patients ranged from those having no insight about illness and treatment to those having distinct insight. Forty-eight percent of the patients in this study had insight. It was demonstrated that Fishbein's value-expectancy model (1980) can indeed be useful in assessing attitudes of schizophrenic patients toward taking medications.

Fishbein's expectancy-value model of attitude was used to measure parental attitudes and adjustment to childhood epilepsy. Austin, McBride and Davis (1984) in a pilot study involving 20 parents of children with epilepsy utilized an open-ended

approach to elicit 18 fixed-belief statements for the final questionnaire. Belief strengths and evaluations were obtained from each parent on each fixed-belief statement. A parental adjustment to epilepsy measure was developed from the literature and pilot-tested on 10 parents. Five major areas were assessed: child's health, social stigma from epilepsy, effect on family, discipline, and limitations of the child's activities. Parents responded to 41 items of this measure with how often (always = 7 to never = 1) they felt or behaved in a specific manner. A psychiatrist and psychiatric social worker who worked with parents of children with epilepsy found the adjustment measure to have content validity. Cronbach Alpha was ($r = .82$, $n = 50$) for parents in this sample. A psychiatric social worker assessed adjustment for each parent during an interview and obtained a measure of construct validity. Cronbach's alpha was .92. The following additional data was collected for analysis: the number of seizures the child was experiencing; parents perception of seizure control; and length of time the child had epilepsy. Fifty parents of children with epilepsy treated on an outpatient basis in a large children's hospital took part in the study.

A major finding in this study was that the attitude-adjustment relationship was positive ($R = .52$, $p < .001$) and the relationship was much stronger for the mothers ($R = .67$, $p < .001$) than for the fathers ($R = .31$, $p = .49$). Parental attitude scores were not found to be influenced by seizure control, perception of seizure control nor the length of time the child had epilepsy ($r = .16$ to $.18$). A one-way ANOVA was used to examine gender of parent, gender of child, and seizure control differences. Parental attitudes were found to be significantly lower ($F = 7.56$, $p < .01$) when the child was female ($X = -.82$) rather than male ($X = 3.28$). This study also compared the open-ended belief format with the fixed-belief format. Two attitude scores were obtained from each parent. Ajzen and Fishbein (1980) suggest the fixed-belief format for identification of belief strength can be a substitute for comparing a wide range of beliefs to constancy of beliefs by all subjects elicited in the open-ended format. During structured interviews parents were asked to

state what they believe to be true about epilepsy in their child. To assess belief strength parents responded with how sure they were (0% to 100%) that the belief was associated with the attitude object. A positive correlation between attitude scores was found ($r = .60, p < .001$). The range for the open-ended attitude score ranged from -18.0 to +12.2, while the fixed-belief attitude score ranged from -14.8 to +23.4. This finding suggests measuring belief strength on a 0% - 100% scale is an alternative to the open-ended approach.

Shamansky, Schilling and Holbrook (1985) utilized the theory of reasoned action to determine factors associated with the behavioral intention to use nurse practitioner services among health care consumers. Six hundred names were drawn from the New Haven and Guilford telephone directories. A letter was mailed to each potential subject one week prior to the telephone interview to explain the study. An "innovation subscale", measuring respondent's reactions to an innovative service, nurse practitioner care, was chosen from a 71-item instrument, adopted from Smith and Schamansky (1983). Spearman-Brown internal consistency for this innovation subscale yielded a .54 reliability coefficient. The subscale measured: five items related to consumer behavior on a Likert scale 1 (definitely would not) to 10 (definitely would buy); five items related to the value of selected nurse practitioner functions; 5 items assessed cost of nurse practitioner services; and other items assessed demographic and psychographic characteristics of respondents. Three hundred thirty-one respondents provided the following results: intent to use nurse practitioner services was not statistically associated with a summary measure of innovative products ($OR = 1.13; p = .74$); the cost factor of nurse practitioner services revealed: if nurse practitioner was covered by insurance, 79.3% said they would seek their care, if not covered by insurance, 63.8% would decline nurse practitioner care, if nurse practitioner care cost the same as a physician, 41.1% would seek their care and 44.9% would decline it, if nurse practitioner care cost more than a physician, 74.8% would decline care, and if nurse practitioner care cost less than a

physician, 70.2% would seek care. Demographic and psychographic factors that influenced intent to use nurse practitioner services when covered by insurance which were statistically significant: age ($OR = 1.8, p = .2$), satisfaction with present health care ($OR = 2, p = .04$) and home size ($OR = 11.0, .01 < p < .001$). This study used the theory of reasoned action to a limited degree.

Chang, Uman, Linn, Ware and Kane (1985) examined selected components of nurse practitioner's care to determine which contributed most to the intent to adhere to a health care plan. To accomplish this end, 268 women aged 56 to 89 years at 26 senior citizen nutrition sites in a metropolitan area were asked to participate in this study. Respondents were asked to view a videotape which portrayed a nurse-patient encounter. Respondents were asked to answer a set of questions as if they were the patient in the videotape. Each videotape consisted of a hypothetical situation in which a patient with stable chronic angina was cared for by a nurse practitioner and came to a return office visit. Eight videotapes with varying levels of technical, psychosocial and patient participation were produced. Among a five-member panel, 100% agreement was achieved for the high low level of each component depicted in the eight tapes.

Intent to adhere to health care plan was defined as the extent to which the respondents felt they would perform various behaviors agreed upon in the videotape. A five-item intent to adhere scale consisted of items such as the following: "If you were the patient in the videotape, would you cut down on your potatoes and bread as discussed with the nurse practitioner?" Responses ranged from definitely would to definitely would not on a five-option scale. Four items modified from the Patient Satisfaction questionnaire (Ware, Snyder & Wright, 1976) were used to determine the subject's attitudes regarding health care. A five-point scale ranging from strongly agree to strongly disagree was used.

Analysis of variance indicated that high psychosocial care (tapes #1,#2,#3) resulted in significantly greater intent to adhere. An analysis of covariance found the

subject characteristic variables (covariates) to be significantly correlated with the intention to adhere to a hypothetical health care plan ($F = 6.22, p < .001$). The covariates selected (widowed marital status, Jewish religion, high pre-existing satisfaction with health care, high importance of a physical exam and high social network) were selected based on significant correlations with one or more of the dependent variables.

The researchers did enumerate various limitations of the study (volunteer sample hypothetical situation, previous experience with angina, etc.). However, the study did demonstrate that personal characteristics are influential in stimulating intent to adhere to the care plan.

Fishbein and Ajzen (1975) model was used to study contraceptive behavior of college-age males. Ewald and Roberts (1985) study was a partial replication of a study done by Fisher (1978). Fisher developed a measure derived from Fishbein's model (1980) to assess specific contraceptive behavior among adolescents. Ewald and Roberts simultaneously collected data on contraceptive behavior with data on beliefs, attitudes and intentions for 54 sexually active, never married males between the ages of 18 and 20 attending a community college or university. The subjective norm measure was not included in the study. Volunteers were asked to complete a 51-item questionnaire designed to obtain current sexual activity and contraceptive behavior followed by beliefs, attitudes and intentions. The model components were tested using path analysis. The path coefficient ($B_1 = .34 (p < .001)$) indicated a significant positive association between beliefs about condom use and attitudes about condom use. The second path coefficient ($B_2 = .56 (p < .05)$) showed a significant positive association between attitudes about condom use and intentions and behavior ($B_3 = .56 (p < .05)$) which indicated a significant positive association between intention and behavior in the past month. For this sample of 18-20 year old college males, positive beliefs and attitudes along with intention to use condoms, were positively associated with condom use. This study supported the Fishbein model suggesting the utility of the model for examining contraceptive behavior. These

researchers stated nursing interventions are usually designed to modify behavior patterns which focus on behavior, perhaps this focus should be upon attitudes and beliefs.

Pender and Pender (1986) used the theory of reasoned action as a conceptual framework for analyzing the relationships among attitudes, subjective norms and intentions to engage in three specific health behaviors. According to the theory of reasoned action, individuals are more likely to participate in health behaviors if such behaviors are seen as helpful in achieving desired outcomes and are considered beneficial by persons or groups the individual wishes to please. The three specific health behaviors were: exercise regularly; maintain/attain recommended weight; and avoid highly stressful life situations. A representative sample of 160 residents of households from two northern Illinois communities elicited salient beliefs and referents for the final questionnaire. Weight, perceived health status, and selected demographic variables were also determined. The final measure was evaluated for internal consistency and test-retest reliability. Standardized coefficient alphas for attitude measure were: exercise, .87; weight, .75; and stress, .78. Standardized coefficient alphas for the subjective norm measure were: exercise, .90; weight, .85; and stress, .81. Test-retest reliability was performed on 30 graduate nursing students over a 2-week time interval. Results were: .93 for behavior intention, .78 for the attitude measure, and .82 for the subjective norm measure. The final questionnaire was administered to 377 respondents from a random sample of 523 households. Stepwise multiple regression revealed the multiple correlation between the two components of the model and intention to exercise was significant, ($r = .233$, $p < .01$) accounting for 5.5% of the variance in intention. The correlation coefficient for subjective norm with intention to exercise was, ($r = .263$, $p < .01$) while the attitude measure and intention was, ($r = .127$, $p < .01$). When the variables of weight of the individual was regressed on subjective norm and attitude, the variance explained in intention to exercise more than doubled (13%) ($R = .364$, $p < .01$). Only attitude was associated with both intention to eat a diet conducive to attaining/maintaining

recommended weight, ($r = .127, p < .01$) and intention to manage stress by avoiding highly stressful situations, $r = .271, p < .01$. "The multiple regression coefficient for attitude, weight and perceived health status was .428, $p < .001$ with 18% of the variance in intention to control weight explained" (Pender & Pender, p. 17). The results of this study suggest attitudes exert an effect on intentions to engage in the three health promoting behaviors examined. However, it was found that subjective norm did exert more influence on intention to regularly exercise than did the attitude measure. Hence, the determinants of behavior are crucial to understand and to promote health behavior.

Bowles (1986) used Fishbein and Ajzen's (1975) theory of reasoned action to construct and validate a semantic differential measure to determine women's attitudes toward menopause. Conceptually, the theory of reasoned action provided a sound rationale to construct a measure of attitude toward menopause. Bowles indicated, "A woman learns or forms a number of beliefs about the menopausal experience. The woman's attitude toward this experience is determined by her beliefs that menopause is associated with other events, feelings, and symptoms, as well as her evaluation of them" (Bowles, p. 82). The subjects for the pilot test were 504 volunteer females from various organizations and groups of northern Illinois. The subjects completed 45 bipolar adjective scales. Subjects indicated the degree to which the adjective pairs were related to feelings a woman may experience during menopause. A principal component factor analysis was performed and revealed 20 adjective scales with a .71 factor loading or greater. These 20 scales represented the evaluation dimension for the concept of menopause. Cronbach's alpha was .96. The second validation sample consisted of 419 females who completed the revised 20 adjective scale measure called the Menopausal Attitude Scale (MAS). A principle component factor analysis was performed for the MAS, all 20 scales loaded on one factor and accounted for 61.5% of the variance. Cronbach alpha was .96. The second group of 419 respondents also provided a measure of construct validity in the form of convergent and discriminant validity. The sample was

divided into three groups and each group completed one of the following measures to establish construct validity: Attitudes Toward Menopause Scale to establish convergent validity (Neugarten, Wood, Kraines & Loomis, 1963; Kogan, 1961), Attitudes Toward Old People Scale to establish discriminant validity, and the Attitude Toward Women Scale (Spence, Helmreich & Stapp, 1973) and the MAS as a second measure of discriminant validity. When the scores for each scale were correlated with the MAS, Pearson product moment correlation coefficient revealed the following correlations respectively: ($r = .63$; $r = .42$) and ($r = -.04$). Test-retest reliability for the MAS was .87 after a 6-week time interval. Multiple regression analysis revealed age and menopausal status as two explanatory variables for the variance of the MAS scores. The use of the MAS for attitude assessment provides an understanding of "other variables" related to menopause. It also provides an understanding of menopause and its relationship to other aspects of a women's mid-life experiences.

Prestholdt, Lane and Mathews (1987) used the theory of reasoned action (1980) to build a model of nurse turnover. The theory provided these researchers with an understanding of complex decision-making processes. "Specifically, the process is revealed as a hierarchical sequence leading from beliefs, through attitudes and social norms, to intention, and finally, to behavior" (Prestholdt et al., 1987, p. 221). Specifically, the researchers tested the theory of reasoned action and compared its predictive effectiveness with two modifications to the theory. The first modification involved the addition of moral obligation as a predictor variable for intention. The second modification involved the use of a differential measure (the difference between remaining and resigning) as opposed to the usual single behavioral alternative. In a pilot study, 109 nurses provided salient beliefs and referents. The final questionnaire administered to 885 nurses in 21 Louisiana hospitals consisted of a measure of attitude, subjective norm, moral obligation and behavioral intention. A differential measure was constructed for each of the above components studied. Behavioral intention was

measured for two behaviors: "remaining on the staff of this hospital" and "resigning from this hospital". To assess behavior, 6 months later the hospital provided the employment status of each nurse. Thirteen predictor variables (five components of the theory, moral obligations and seven demographic variables) were entered into a hierarchical multiple regression analysis with employment status as the dependent variable. Differential intention was the only significant predictor for employment status. Differential attitude ($B = .72, < .001$), differential subjective norm ($B = .10, p < .01$), and differential moral obligation ($B = .10, p < .01$) were the only significant predictors of differential intention. The regression analyses were repeated using model measures that related only to resigning behavior to determine the second modification to the theory. The expanded model consistently demonstrated the advantage of using measures that relate to both behavioral alternatives. This research suggests the utility of Ajzen and Fishbein's (1980) theory of reasoned action to nurse turnover. Knowledge of the underlying beliefs, attitudes, intentions of nurse turnover will aid those concerned with recruitment/retention efforts.

Savage, Cullen, Kirchhoff, Pugh and Foreman (1987) utilized the theory of reasoned action to examine the extent to which attitude, subjective norms and behavioral intentions influence a nurse's decision to comply with a "do not resuscitate order." The theory applies to this situation since nurses involved in the care of such a baby must come to terms with their beliefs about the situation and explore their personal attitudes about the do not resuscitate decision. Three registered nurses in 10 perinatal centers in one midwestern state participated in the study. Subjects were asked the prevalence of a "do not resuscitate" policy in their neonatal intensive care unit and to complete a demographic data form. Also, using Ajzen and Fishbein (1980) format, nurses' attitudes, subjective norms, and behavioral intentions toward complying with a do not resuscitate order in four hypothetical situations were elicited. The four hypothetical situations described infants

with various expected outcomes of recovery and potential capabilities. Test-retest reliability over a two-week time interval was ($r = .765$).

The results of this study indicated that nurses' intention to resuscitate an infant despite a "do not resuscitate" order, depended on a description of the infant's physical condition and a perceived unfavorable prognosis. Attitudes and subjective norm were significantly correlated with intention to resuscitate, $p < .001$ with correlation coefficient ranging from .58 to .93. Multiple regression analysis revealed subjective norm ($B = .41$ to .82) exerted more powerful influence on nurses' decisions not to resuscitate than attitudes ($B = .17$ to .39).

This study also depicted beliefs about caring for infants with various disabilities. This data indicates attitudes and subjective norms, as determinants of intention, impact professional behaviors of the neonatal intensive care nurse.

Lierman, Young, Kasprzyk and Benoliel (1990) cited several advantages of the theory of reasoned action: (a) the relationships of the model components are clearly specified by mathematical formulations, (b) there are specific guidelines for operationalizing the major constructs, (c) instrument development is grounded in the target population, and (d) a social normative component is included. These researchers used the theory of reasoned action to predict intention to perform breast self-examination and breast self-examination behavior. It is common nursing practice to encourage and teach self-breast examination to patients. Effective teaching must be based upon an understanding of the factors which influence this behavior hence, the theory of reasoned action provides a methodology to determine these factors.

The pilot study was done on 29 women from women's organizations of 12 local churches. Ajzen and Fishbein (1980) strategies were utilized for the pilot measure. Also included were current breast self-exam practices; beliefs about cancer, and cancer treatment; and people with whom they had discussed breast self-exam.

The revised instrument, referred to as, the Beliefs and Attitudes Questionnaire, consisted of the following measures; behavior; intention; affect, a direct measure of attitude; attitude, sum of the products of behavioral beliefs times evaluation of beliefs; social norm, sum of the products of normative beliefs times motivation to comply; and global social norm, as a direct measure of social norm. One hundred and eight volunteers from various women's organizations completed the revised measure.

Regression analysis revealed the indirect measures, attitude and social norm, with intention to perform breast self-exam as the dependent variable were found to have a multiple R of .58. The beta weight of attitude = .52 and for social norm = .13. The direct measures, affect and global social norm revealed a multiple correlation of .47. Beta weights were .43 and .08 respectively. In contrast to the model's assumptions, the indirect measures of attitude and social norm accounted for more variance (32%) in both intention and behavior, and explained actual behavior better than intention to perform.

This section of the review of the literature examined 11 nursing studies utilizing Ajzen and Fishbein's (1980) theory of reasoned action. The studies reviewed were conducted between the years 1981 and 1990. All of the studies reviewed were clinical investigations. Behaviors ranged from male contraception to nurse turnover. Subjects for two of the studies were nurses while all others were either patients or lay public. All of the studies either applied one or more constructs of the theory of reasoned action or utilized the theory as a conceptual framework. One study specifically used the theory of reasoned action as a conceptual framework to develop and validate a semantic differential instrument to measure attitude toward menopause. Five studies utilized some degree of Ajzen and Fishbein's strategies for elicitation of beliefs and construction of the final questionnaire. In general, the theory of reasoned action appears to possess utility for nursing practice which is designed to understand and in some instances alter human behavior.

In conclusion, Ajzen and Fishbein's (1980) model appears to be a useful model for understanding human behavior. This model provides the researcher with a theoretical framework to predict human behavior when operationalized in a research study.

The theory of reasoned action was used in the general nursing research literature for the following purposes:

to determine its usefulness to nursing; to derive attitudes toward selected health behaviors; to elicit parental attitude and adjustment to a chronic illness; to determine behavioral intention to use selected health services; to determine intent to adhere to a health regimen; to identify attitude, subjective norm and behavioral intention toward selected health behavior; conceptual considerations of the theory of reasoned action to develop an instrument to measure attitude toward a life event; to test and expand the theory of reasoned action; to determine how the constructs of the theory of reasoned action influence nurse behavior; for prediction of selected health behaviors.

The focus of the general nursing research literature involving the theory of reasoned action centers upon the ability of the theory to impart an understanding of the determinants of human behavior, specifically health-related behaviors. Application of the theory of reasoned action in this study enabled the researcher to discover whether the direct or indirect measures of attitude and subjective norm contributed more weight in predicting behavioral intention and subsequent adherence behavior. Critical underlying beliefs were derived and may prove useful in attempting to change this health-related behavior.

Nursing Research: Cardiac

The nursing research literature involving specifically the cardiac patient population, is composed largely of a series of investigations by the same researchers. Since the late 1970s, Miller, Johnson, Garrett, Wikoff, McMahon and later Ringel have

applied Fishbein's model (1980) to myocardial infarction patients and examined their adherence to the medical regimen prescribed for their recovery. The researchers, in their early efforts aimed at application of the model to myocardial infarction patients, but did not follow Ajzen and Fishbein's specifications for the construction of questionnaires. However, they demonstrated the model's usefulness in understanding and explaining the behavior of myocardial infarction patients. In 1982a, Miller, Johnson, Garrett, Wikoff and McMahon examined the interrelationship of beliefs, attitudes, subjective norm, intention and behaviors related to the medical regimen in a sample of patients with various forms of cardiac disease. Twenty-seven heart patients participating in a cardiac rehabilitation program were asked to complete a Health Intention Scale (HIS). The Health Intention Scale (developed by Miller et al. , 1982b) is a five point Likert scale ranging from unlikely (1) to likely (5). The first part of the scale indicates the subjects' intentions to perform five actions of the medical regimen (medication, diet, smoking, activity and stress). The second part indicates subjects' perceptions regarding which actions of the medical regimen the people most important to them think they should or should not perform along with the advantages and disadvantages of performing the behaviors of the medical regimen. Medical and demographic data forms were also completed to assess relationships. Six months later the same respondents were asked to complete a Health Behavior Scale where intention items were converted to behaviors for the same five behaviors of the medical regimen. Using Spearman rank correlation, the researcher found a significant relationship between the intention and behavior regarding diet ($r = .60, p < .001$). No other significant relationship was found for the other four behaviors of the medical regimen.

Miller, Wikoff, McMahon, Garrett and Johnson (1982b) also developed a Health Attitude Scale. This scale assessed the attitudes of cardiac patients toward prescribed behaviors of the medical regimen. The scale was named the Miller Attitude Scale (MAS). It is a 9-item, 7-point semantic differential scale to measure favorable or

unfavorable attitudes toward performing regimen prescriptions. The validity and reliability of the Miller Attitude Scale was tested using two groups of cardiac patients. Group 1 consisted of 480 members of Mended Hearts, Inc. with varied heart conditions; patients were drawn from six geographic regions of the United States. Group 1 completed the attitude scale at chapter meetings. Group 2 consisted of 35 patients diagnosed with a first myocardial infarction in four hospitals in the area. Group 2 completed the attitude scale at hospital discharge and repeated the questionnaire at 6 months after hospitalization. Behaviors for Group 2 were verified during the six month follow-up period using the Health Behavior Scale by the patient and a family member.

Spearman's rank order correlation was used to assess attitude and adherence behavior relationships indicative of predictive validity. Attitudes and behavior were found to correlate significantly with subscales of diet ($r = .31, p < .05$); activity ($r = .46, p < .01$) and smoking ($r = .62, p < .001$), but not for medication ($r = .12$) or stress ($r = .15$). To provide a measure of accuracy of patient responses, a "significant other" also completed a similar version of the Health Behavior Scale. Patient-family correlations revealed significant relationships for diet, activity, medication and smoking. Factor analysis of the data revealed that eight factors accounted for the majority of the variance. Each of the five behaviors of the medical regimen defined a factor using a varimax rotation. The sixth factor was termed the "burden factor" which loaded significantly on items: difficult versus easy and aggravating versus soothing. Subjects rated the overall regimen with these terms rather than specific behaviors. A seventh factor termed "fairness" loaded significantly on fairness versus unfair adjective pair for overall regimen prescriptions. The eighth factor was termed "desirability" based on the paired adjectives harmful versus helpful, unnecessary vs helpful, again for overall regimen prescriptions. The study established the reliability of the Miller Attitude Scale for assessing attitudes of cardiac patients toward five behaviors of the medical regimen. Alpha reliabilities for

both groups indicated a high degree of internal inconsistency of scale items for all five subscales.

Miller, Johnson, Wikoff, McMahon and Garrett (1983) compared patient attitude toward and adherence to the medical regimen in myocardial infarction (MI) and cardiac bypass patients (CABG). This investigation was based in part on the Fishbein model (1980). Patient attitude was measured using the Miller Attitude Scale and adherence to the medical regimen was measured using the Health Behavior Scale (behavior currently practiced). The subjects were 60 patients who had experienced their first myocardial infarction and 347 cardiac bypass patients selected randomly from Mended Hearts, Inc. Both groups received instruction about the medical regimen, either during hospitalization or in the physician's office. Group I (MI) completed the Miller Attitude Scale and the Health Behavior Scale prior to discharge from the hospital and again 6 months after hospitalization (in their homes). Group II (CABG) completed the Miller Attitude Scale and a behavior checklist in their homes. The results indicated both groups exhibited favorable attitudes toward taking medications and following activity prescriptions. The myocardial infarction patient group revealed their least favorable attitudes were following smoking restrictions and adhering to diet, while the cardiac-bypass-patients felt the least favorably about diet adherence and stress modification. The two groups exhibited significant differences in attitude towards the actions of smoking and medications.

Myocardial infarction patients adhered most to medication behavior and least to diet and smoking restrictions. The bypass patients adhered most to smoking and diet restrictions, and least to stress modification. Adherence behaviors were not compared for the two samples due to different measures of adherence. Pearson product correlation identified significant relationships between attitude and adherence to all actions of the medical regimen for Group 1 and for all actions except physical exertion for Group 2. This investigation indicated that assessment of attitudes may provide valuable information for patient compliance.

Miller, Wikoff, McMahon, Garrett and Ringel (1985) utilized Fishbein's model (1980) to examine the relationships between attitudes, perceived beliefs of others, and intentions toward medical regimen adherence and actual behavior for myocardial infarction patients. These variables were assessed at three points in time: during hospitalization, and at 6 and 9 months after hospitalization. The subjects were 112 myocardial infarction patients from five institutions that provided cardiac rehabilitation programs. Prior to discharge from the hospital, patients completed the Miller Attitude Scale and the Health Intention Scale. Medical and demographic data forms were also completed to assess relationships.

Six to nine months after hospitalization patients completed the Miller Attitude Scale, the Health Behavior Scale and medical and demographic data forms. The Health Behavior Scale-Family was completed by a family member to verify the patient's adherence to the medical regimen. The Health Behavior Scale is an adaptation of the Health Intention Scale in which intention statements are changed to behavior statements.

Multiple regression analysis was used to determine prediction of patients' adherence behaviors. The results indicated that intentions during hospitalization are related to attitudes and perceptions of the beliefs of others concerning one's intentions to obey the five prescriptions. The perception of significant other's beliefs contributed most to prediction of intentions for each of the prescriptions. Adherence to the medical regimen 6 to 9 months after hospitalization as related to one's attitudes and intentions during hospitalization was significant for diet and activities ($r = .33$ with diet and $r = .26$ with activities). Attitudes and intentions related to smoking, medications and stress during hospitalization were not significantly related to adherence after hospitalization. Both attitudes and perceived beliefs of significant others after hospitalization were significantly related to patients' statements of adherence for all prescriptions except for medications at 6 to 9 months after hospitalization. Intentions during hospitalization and

adherence at 6 to 9 months after hospitalization were not statistically related to demographic variables as hypothesized.

The findings of this study indicate that the point in time to provide information and discuss lifestyle adjustments to promote medical regimen adherence is after hospitalization. Based on the findings attitudes and perceived belief of others at 6 - 9 months post hospitalization were indicators of regimen adherence. Therefore, rehabilitation plans for the post myocardial infarction patient should be individualized for hospital and home. In yet another study, McMahon, Miller, Wikoff, Garrett and Ringel (1986) examined the relationships between four specific life situations, the intentions of hospitalized myocardial infarction patients toward the prescribed medical regimen and adherence to the medical regimen at 6 to 9 months after the infarction. This study focused on the impact of adherence to the medical regimen on four life adjustment situations (home, work, recreation and social activity).

The final study sample included 112 first myocardial infarction patients from five hospitals with associated cardiac rehabilitation programs. Each subject completed the Health Intention Scale and a demographic data form prior to discharge from the hospital. Six to nine months later, the subject completed the Health Behavior Scale and a medical data form. A family member also completed the Health Behavior Scale to verify the subject's adherence to the behaviors of the prescribed medical regimen. Pearson product-moment correlation was used to identify the relationships among life situations, hospital intentions and adherence to the medical regimen post-hospitalization. During hospitalization, subjects exhibited strong intentions to follow the medical regimen in all four life situations. The strongest intentions indicated were for the home situation while the weakest intentions were for the work situation.

Although patients indicated strong intentions to adhere to the prescribed medical regimen at hospital discharge, a significant decline ($p < 0.001$) in mean scores for adherence behaviors occurred in all life situations: home, ($t = 8.03$) ; (work, $t = 7.25$) ;

sports, ($t = 7.31$) ; social, ($t = 8.01$) . The greatest decline was noted for the work situation and the least for the home situation.

The perceived beliefs of significant others' section of the Health Behavior Scale indicated that adherence health behaviors at 6 to 9 months post-hospitalization was significantly related to the perceived beliefs of significant others: home, ($r = 0.68$, $p < 0.001$) ; work, ($r = 0.80$, $p < 0.001$) ; sports, ($r = 0.67$, $p < 0.001$), and social, ($r = 0.62$, $p < 0.001$) . No significant differences were noted between subject's responses and those of their family members for verification of adherence behaviors. The findings of this study indicate the time of instruction regarding the prescribed medical regimen and the significance of perceived beliefs of significant others are important factors to consider during cardiac rehabilitation.

Miller, Wikoff, McMahon, Garrett and Ringel (1988) examined the effect of a nursing intervention on medical regimen adherence and societal adjustment for myocardial infarction patients. Also, attitudes, intentions, perceived beliefs of others, and coping methods were assessed as predictors of societal adjustment and regimen adherence.

The subjects were 103 first time myocardial infarction patients who were studied at three periods in time. At hospital discharge (time 1) the patients completed the following measures: Miller Attitude Scale, Health Intention Scale, Perceived Beliefs of Others Scale and Cardiac Coping Scale, to obtain baseline data on the variables of interest. At the 30 day home visit (time 2) and the 60 day home visit (time 3), subjects were again given the above mentioned measures, with the exception of the Health Intention Scale and the addition of Garrity Social and Psychological Status Scale. The experimental nursing intervention involved three steps. First, data collected at the 30 day home visit was compared to hospital discharge data. Second, the 30 day data was used for problem identification related to medical regimen adherence and societal adjustment. Third, the nurse developed a health plan which included patient goals that addressed

problems of attitudes, medical regimen adherence, coping methods, and societal adjustment in different life situations. The sixty days after hospitalization visit provided an opportunity to measure the effect of the nursing intervention on medical regimen adherence and societal adjustments.

Analysis of variance revealed no significant differences for the first hypothesis: medical regimen adherence and societal adjustment will increase more in patients in the nursing intervention group than in the control group at 30 or 60 days post hospitalization. The second hypothesis: attitudes, intentions, perceived beliefs of others and coping methods as predictors of societal adjustment and regimen adherence was tested using stepwise multiple regression. Perceived beliefs of others were found to be a predictor of medical regimen adherence for smoking, activity, stress, and medications at the 30 day visit. The addition of diet to this list occurred at the 60 day visit. Attitudes were predictive of medical regimen adherence for diet, smoking, and medication at the 30 day visit and diet, smoking, stress, and medication at the 60 day visit.

Intentions during hospitalization were predictive of medical regimen adherence to smoking, and activity at the 30 day visit and diet and stress only at the 60 day visit. Helpfulness of coping methods was predictive of medical regimen adherence for stress modification prescription ($R^2 .64$) ($F 18.82$) at the 60 day visit. Attitude toward activity prescription was the only variable predictive of societal adjustment at either the 30 day or 60 day visit ($R^2 .32$, $R^2 .50$; $F 16.04$, $F 27.69$) respectively for the 30 and 60 day visit.

The findings of this study are in direct contrast to the predictions of the Fishbein (1980) model. These researchers concluded that a lack of sensitivity of the instruments to measure medical regimen adherence and societal adjustment may have accounted for no differences between groups. Also, the high score of the control group may have resulted from the home visit by the nurse for data collection or merely by their own self-evaluation after completing the scales at 30 and 60 days. However, the study did reveal important relationships concerning cardiac rehabilitation: perceived beliefs of others was

the strongest predictor of medical regimen adherence for all prescriptions; attitudes and helpfulness of coping methods were predictive of adherence for stress modifications at the 60 day visit; and for societal adjustment, only attitude toward physical activity regimen was predictive. These findings support the utility of Fishbein's model for prediction of exercise behavior in the myocardial infarction patient population.

In conclusion, Miller has used Fishbein's model (1980) as a theoretical basis for their studies of myocardial infarction patients and their adherence to the medical regimen over the past ten years. Miller (1988) re-emphasized the findings of their work and pointed out that demographic characteristics and personality traits have no direct effect on behavior and are related to behavior only if they influence the beliefs that shape its attitudinal or normative determinants. Miller also indicated their findings, over the ten years, suggested intention to behave in a specific manner changes over time, which emphasizes the need for concurrent measurement of these variables.

The suitability for using Ajzen and Fishbein's (1980) theory of reasoned action to uncover the beliefs of post myocardial infarction patients is best seen in relation to other theoretical formulations. Another proposed theoretical framework, the Health Belief Model developed by Hockbaum, Becker, and Rosenstock has frequently been utilized by various investigators to use health perceptions to explain preventive and rehabilitative health behaviors. Hiseck (1984) specifically used the constructs of the Health Belief Model to devise a tool to predict patient entrance into a cardiac rehabilitation program. The questionnaire contains 14 questions with responses graded on a 7-point Likert type of scale. Four experts in clinical cardiac care critiqued the tool and lended strong support for its use in practice. A pilot test of the tool consisted of four acute myocardial infarction patients completing the questionnaire in less than 8 minutes. The tool was designed to be easily given and evaluated. The predictive ability of the tool has not been tested. A major criticism of this tool and of the Health Belief Model is the beliefs or health perceptions are the beliefs or health perceptions of the investigators. No

opportunity for patient elicitation of beliefs or what this patient population is thinking is afforded.

Hiatt, Hoenshell-Nelson and Zimmerman (1990) similarly investigated the factors influencing patient entrance into a cardiac rehabilitation program. This study was a descriptive pilot study that utilized the Patient Entrance into Cardiac Rehabilitation Program (PECRP) questionnaire proposed by Hijeck to assess factors that distinguish subjects who participate or choose not to participate in a cardiac rehabilitation program. Thirty-nine patients with a cardiac problem completed the questionnaire. Demographic variables, marital status and income, had significant differences on the perceived benefits/barriers construct of the health belief model. Chi-square and t-test statistics revealed no significant differences in any of the demographic variables in those who entered a cardiac rehabilitation program and those who did not.

Both of the above mentioned studies concluded a systematic method to assess patients health beliefs would be helpful in predicting patients' decisions whether to enter a cardiac rehabilitation program or not. Specific nursing strategies could then be devised and implemented to reinforce accurate beliefs and dispell misconceptions. However, their methods to determine beliefs among this heterogenous patient population remains questionable.

In summary, the nursing research performed with the cardiac patient population indicated the usefulness of Ajzen and Fishbein's (1980) theory of reasoned action to nursing. The extensive work of Miller and McMahon focused much of their research on the single measure of attitude in relation to the five prescriptions of the medical regimen post cardiac event. Miller at al.,(1982a, 1982b, 1983, 1988) and McMahon et al.(1986) tested the relationship between the various constructs of the theory of reasoned action, yet the direct and indirect measures were not derived according to Ajzen and Fishbein's (1980) guidelines. Therefore, the validity of their results should be interpreted with caution.

More specifically, Miller and colleagues (1982a) development of the Miller Attitude Scale and the analysis of the data, were not consistent with Ajzen and Fishbein's format for construction of a questionnaire. Miller et al., (1982a, 1982b) made reference to Fishbein and Ajzen's (1975) guidelines for instrument development, however, lack of adherence to these guidelines may have resulted in the lack of support for the theory of reasoned action in both of Miller et al. (1982a, 1982b) studies. Miller and colleagues (1983, 1985) examined the attitude-adherence relationship again with the five actions of the medical regimen. Significant findings supported the theory of reasoned action, yet revealed insufficient use of the theory of reasoned action. McMahon et al. (1986) examination of behavioral intention and medical regimen adherence over time for four life situations and Miller et al. (1988) study of the influence of a nursing intervention on medical regimen adherence and societal adjustment was based on Ajzen and Fishbein's theoretical model, however, neither study used Ajzen and Fishbein's methodology. Miller's (1988) findings are in direct contrast to the Ajzen and Fishbein model. The author concluded that the lack of sensitivity of the instruments to measure medical regimen adherence and societal adjustment may account for the lack of difference between the experimental and control groups. On the other hand, conclusions that can be drawn from the work of Miller et al. (1982a, 1982b, 1983, 1985, 1988) and McMahon et al. (1986) with regard to the theory of reasoned action were that the various studies did not adhere to Fishbein and Ajzen (1975) Ajzen and Fishbein (1980) specifications ; beliefs and the evaluation of beliefs as the building blocks of the attitude component of this theory were not incorporated into the design, emphasizes the lack of the indirect measure of attitude in this research; and at no time was this research based on attitude as defined by Ajzen and Fishbein. Thus, to date, the theory of reasoned action, using Ajzen and Fishbein's methodological guidelines, has not been tested in a sample of post myocardial infarction patients.

Nonetheless, these empirical works did reveal some significant nursing implications for example: (1) the Miller Attitude Scale may be useful planning individual rehabilitation programs, (2) that identification of unfavorable attitudes during hospitalization may be effectively managed with situational support, and (3) a measure of attitude may provide one indicator of adherence.

Therefore, the current study was a unique undertaking because it was grounded in the cardiac patients beliefs. Unlike Miller et al (1982a, 1982b, 1983, 1985, 1988) and McMahon et al. (1986) this study tested the predictive relationships between the direct and indirect measures of the Ajzen and Fishbein model (1980) rather than simply employing Ajzen and Fishbein's model as a conceptual framework. Unlike the works of Hijeck (1984) and Hiatt, Hoenshell-Nelson and Zimmerman (1990) this study derived beliefs from a sample of post myocardial infarction patients' in order to develop an accurate belief inventory.

Also, in contrast to many of the studies reviewed, this study used a homogenous sample of post myocardial infarction patients and examined not only the direct measures of attitude and subjective norm as predictors of behavioral intention and behavior, but also focused on the predictive role of the indirect measures (beliefs about the outcome of behavior, evaluation of those outcomes, normative beliefs and motivation to comply), as well as specific a priori beliefs derived from the literature. This study also determined the role of behavioral intention in the prediction of participation behavior.

In summary, this study employed Ajzen and Fishbein's theory of reasoned action (1980) as a predictive model for enrollment and participation in a cardiac rehabilitation exercise program for the myocardial infarction patient population. The specific aims of this study were to formulate a belief inventory and to determine the predictive relationships among the direct and indirect measures of the Ajzen and Fishbein model (1980) to test: (1) the behavioral intention to enroll in a cardiac rehabilitation exercise program, and (2) to actual participation behavior in the program.

Ajzen and Fishbein's theory of reasoned action (1980) is a useful theory for unveiling, understanding, explaining and predicting human behavior. The contributions for nursing derived from this study are: the elicitation of the underlying beliefs of post myocardial infarction patients in regard to exercise in a cardiac rehabilitation program and that whether the direct measures or indirect measures of the theory contribute more weight in predicting behavioral intention and behavior. Both findings are useful to nurses attempting to help patients to modify their behavior post infarction.

Chapter IV: Phase I

Purpose and Design

This study utilized the model and methods of Ajzen and Fishbein's theory of reasoned action (1980). The purpose of Phase I was to elicit beliefs regarding exercise in a cardiac rehabilitation program from a sample of post myocardial infarction patients.

Procedure

Subjects and Selection

Phase I data collection took place at a large teaching hospital affiliated with Brown University Medical School. Phase I data collection also employed two other settings, the patient's home and a cardiac rehabilitation center. All subjects who participated in Phase I of this study were patients at Rhode Island Hospital during the acute phase of their illness, discharged to home, or referred to the Atrium Health and Fitness Center. Subjects eligible for this study were either male or female between the ages of 22 and 80. A diagnosis of myocardial infarction was made by significant electrocardiogram changes or enzyme elevations. Subjects should not have previously participated in a cardiac rehabilitation program. Subjects were English speakers who were free of other complicating medical conditions. All subjects met cardiac rehabilitation program criteria for admission and participation.

Subjects excluded from this study were those individuals with medical complications after myocardial infarction or subjects with a history of a psychiatric disorder. The sample size for Phase I was $N = 50$.

Informed consent to participate in Phase 1 of this clinical study was obtained from the University of Rhode Island and Rhode Island Hospital institutional review boards for human subjects. All subjects were given a verbal explanation of the Phase 1 open-ended questionnaire and the subject's agreement to participate in the study was obtained.

Post myocardial infarction patients could be in one of four phases of recovery: in the hospital; at home; in a cardiac rehabilitation program; or in a cardiac-maintenance program. The point in time of the patient's recovery was noted by the researcher. The four points in time represent the four phases of cardiac rehabilitation. The patient log book on the cardiac stepdown unit identified post myocardial infarction patients discharged to home approximately 1 to 2 weeks after their myocardial infarction. The cardiac rehabilitation program at Rhode Island Hospital, located at the Atrium Health and Fitness Center, provided the identification of post myocardial infarction patients in cardiac rehabilitation, as well as in the cardiac-maintenance program.

Prior to requesting patient participation, the patient charts were reviewed to determine eligibility. Eligible patients in the hospital were approached individually in their hospital room 2 to 3 days prior to discharge to complete the open-ended questionnaire. Eligible patients in the home setting were telephoned to request participation in the study. Home patients who agreed to participate were sent a questionnaire and an informed consent form in the mail. Nine of the 10 mailed questionnaires were returned. Eligible patients in the cardiac rehabilitation program or maintenance program were approached individually during one of their exercise sessions at the Atrium. The researcher collected all data for Phase I of this study during a period of 2 months.

Elicitation of Beliefs

Ajzen and Fishbein (1980) describe specific strategies for measuring beliefs, attitudes, subjective norm and behavioral intention. Their method is a two phase process in which responses to an initial, open-ended questionnaire in Phase I provide for the development of a belief-item pool from which an individual's most salient beliefs are generated.

To fulfill Ajzen and Fishbein's (1980) criteria for development of questions to elicit salient beliefs, the behavioral elements of the theory were specified as: the behavioral criterion (action) was exercise participation with respect to a specific target, the post myocardial infarction patient, in the context of a cardiac rehabilitation exercise program, at 4 to 6 weeks after hospitalization. To ensure the correct belief was elicited, Ajzen and Fishbein recommended correspondence between the four behavioral elements. Changing one of the four elements defining the behavior can elicit a completely different set of salient beliefs (Ajzen & Fishbein, 1980). For example, to elicit beliefs underlying a patient's attitude toward a cardiac rehabilitation exercise program the following questions were worded according to Ajzen and Fishbein's criteria of correspondence for the four elements of the Phase I questionnaire:

1. What do you believe are the advantages of undertaking a cardiac rehabilitation exercise program 4-6 weeks after a heart attack?
2. What do you believe are the disadvantages of undertaking a cardiac rehabilitation exercise program 4-6 weeks after a heart attack?
3. Do you have any other beliefs regarding a cardiac rehabilitation exercise program 4-6 weeks after a heart attack?

Salient referents were also identified by responding to the following open-ended questions regarding enrollment in an exercise program post myocardial infarction.

4. What individual or group of people would approve of your participation in a cardiac rehabilitation exercise program 4-6 weeks after a heart attack?
5. What individual or group of people would disapprove of your participation in a cardiac rehabilitation exercise program 4-6 weeks after a heart attack?
6. Which people whom you know other than the ones just listed would be interested in your taking part or not taking part in a cardiac rehabilitation exercise program 4-6 weeks after a heart attack?

The actual questionnaire for elicitation of beliefs may be found in Appendix B.

Results

Elicitation of Beliefs

The sample (N=50) completed the Phase I open-ended questionnaire. Forty patients were male while the other ten patients were female. The subjects age ranged from 26 to 68 years with a mean age of 55 years. The mean educational level was 14 years. The employment status of the sample revealed 40% professionals, 40% white/blue collar status and 20% were not employed. Forty-nine subjects were caucasian and one subject was black. The majority of the sample was married (80%) while the other 20% were either widowed, divorced, or single. All patients (N=50) had a history of a recent myocardial infarction. The time elapsed since the patient's myocardial infarction and completing the Phase I questionnaire was anywhere from 5 days post infarction for hospital patients, 2 weeks post infarction for patients discharged home, to 6 months post infarction for rehabilitation and maintenance patients. Twenty-one percent of the subjects responded while hospitalized; 15% of the subjects responded while at home recuperating; 32% of the subjects responded in the cardiac rehabilitation program; and 32% of the subjects responded in the maintenance program. As previously discussed, subjects responded to seven short open-ended questions (Appendix B). Each patient interview took approximately 15 minutes. Subjects completed the questionnaire without the assistance of others. The patients were assured their responses would remain confidential.

A few patients experienced some difficulty with the open-ended questions regarding the meaning of the questions and required clarification. A moderate degree of probing by the researcher was required to elicit beliefs and social influence regarding exercise in a cardiac rehabilitation program. The majority of patients completed the questionnaire by themselves without problems. No other problems or difficulties were experienced in Phase I of this study. Appendix C, Tables 1-7 contain data from the seven questions of the open-ended questionnaire. Tables 1-3 contain the 53 different

beliefs elicited from questions 1-3 of the open-ended questionnaire. The frequency of responses appears to the right of each belief.

Each belief elicited from the open-ended questionnaire was recorded and the frequency of the response noted as suggested by Ajzen and Fishbein (1980) (see Appendix C). "Once the beliefs were listed, a decision was required to ascertain the number and kind of belief to be included in the salient set. The first step was to organize the responses by grouping together the beliefs that referred to similar outcomes and counting the frequency with which each outcome in a group was elicited" (p.68). Table 1 shows a list of beliefs concerning the safety of exercise after a heart attack. The beliefs were grouped by identifying the similiar outcomes each belief represented. In this case, each belief in Table 1 inferred that exercise in a cardiac rehabilitation program is safe after a heart attack. These beliefs were analyzed and a decision was made by the researcher that as a group, the beliefs represented a single belief with a similiar outcome. For example, the belief statement, "Help me to realize that exercise is healthy, not dangerous" was then identified as a salient belief. Ajzen and Fishbein say, "Common sense is required since no clear rules can be provided" (p.69) to clarify this issue of grouping similiar outcomes or treating them as separate outcomes. However, one solution is to return to the original inventory and assess whether the same individual emitted similar beliefs. These eight beliefs were obtained from responses one, two, and three of the open-ended questionnaire. Table 1 also lists the belief number as found in Appendix C and the frequency of response. Table 1 depicts this grouping process.

It can be seen that five of the beliefs referred to a similar outcome, namely that exercise could potentially be dangerous after a heart attack. Despite the fact that each outcome by itself was mentioned by only a few patients, when grouped together they suggested a salient belief in the patient population concerning the safety of exercise in a cardiac rehabilitation program. The salient belief then was phrased such that the belief

corresponded to the attitude toward the behavior. To complete the example, the eight beliefs of Table 1 were combined to form salient belief number seven of Table 2.

Table 1
Organization of Salient Beliefs

	Belief #	Cardiac- Rehabilitation Exercise Program	Frequency
Belief Group 1	13	Program teaches you you can exercise safely	1
	15	Security of having exercise medically supervised	1
	23	Contact with medical profession	1
	26	Something could happen if your body is not ready	9
	28	If no supervision, activities could be excessive or inadequate	1
	32	Should be supervised by medical personnel	2
	38	Exercise program helps to dispel myths and fears	1
	51	Continued contact and secure feeling with medical profession	1

Each belief statement was reviewed and grouped by the researcher. To assess the extent of agreement among observers, inter-judge reliability was used. One reviewer was a cardiac rehabilitation nurse while the other reviewer was a lay person.

Table 2 depicts the final items or salient beliefs retained for the Phase II questionnaire. Belief statements appear per the actual patient responses in Phase I. The frequency in Table 2 refers to the number of times each outcome in a group was elicited by individual patients. For example, 14 individual patients responded with similar statements regarding a cardiac rehabilitation exercise program increasing and strengthening their heart muscle. Of the responses grouped by similar outcomes, eight beliefs met the criteria for the retention of items recommended by Ajzen & Fishbein. That is, each belief based on the decision rule of Ajzen & Fishbein could be clearly identified in at least 15% of the responses ($N = 8$) made by the sample. To be retained, each salient belief had to have been made by at least eight respondents of the 50 patient representative sample.

Table 2

Identification of Salient Beliefs

	Cardiac- Rehabilitation Exercise Program	Frequency
	Program helps to increase and strengthen heart	14
2	Program helps to build confidence	17
3	No disadvantages	27
4	To get in shape	14
5	Stress from fear that exercise can cause another heart attack	9
6	Program prepares you for your regular routine	17
7	Something could happen if your body is not ready	26
8	Be dangerous so soon after your heart has been damaged	13

Eight salient beliefs were retained for the final questionnaire. Then each belief statement was re-phrased for conciseness and clarity of meaning. Belief statements were phrased at a 6th grade reading level. The 8 salient beliefs retained and rephrased were:

1. Help increase and strengthen my heart muscle.
2. Increase confidence regarding physical condition.
3. Cardiac rehabilitation program will have no bad effects.
4. Get me back in good physical shape.
5. Cardiac rehabilitation program produces stress.
6. Prepare me for my regular daily routine.
7. Help me to realize that exercise is not dangerous.
8. Be dangerous so soon after heart attack.

These eight beliefs as written in the questionnaire may be found in Appendix D(Sections I & II).

Elicitation of normative beliefs

Each referent elicited from the 4 questions of the open-ended questionnaire was recorded and analyzed as in the salient belief component. The total number of referents elicited from question 4 through 7 were 50 and these are contained in Tables 4, 5 and 6 of Appendix C. Of these responses, the following categories were mentioned the most often by subjects: (1) physician (frequency response, 22), (2) family (frequency response, 26) and, (3) friends (frequency response, 11). Because of the similarity of meaning between family and spouse these categories were combined.

Chapter V: Phase II

Purpose and Design

Phase II consisted of developing a preliminary inventory and administering it to 194 post myocardial infarction patients. The purpose of Phase II was to perform an item analysis and to refine the instrument.

Procedure

Subjects and Selection

Subjects were drawn from eight participating acute care hospitals in Rhode Island (Appendix E), all of which had similar recruitment efforts during hospitalization and associated outpatient cardiac rehabilitation exercise programs. The eight hospitals are geographically located throughout the state of Rhode Island. Four of the hospitals were teaching hospitals affiliated with Brown University. All hospitals are accredited by the Joint Commission of the American Hospital Association. The eligibility criteria for inclusion of patients in Phase II of this study was the same as in Phase I. A sample size of 200 was determined as appropriate for both principle component analyses and multiple regression.

Prospective subjects were identified by the nurse manager of the stepdown/telemetry unit or by a nurse liaison in each of the eight participating hospitals. Again, eligibility criteria was given to each participating hospital nurse liaison and recruitment efforts were made by this individual. Each subject was informed of the nature of the study, given a brief verbal overview of the study and, if they agreed to participate, informed consent was obtained by the nurse liaison. The Phase II questionnaire was administered by the nurse liaison to patients during their hospital stay on a stepdown or telemetry unit. Each patient was given ample time to answer the questionnaire (approximately 20 minutes to a half hour).

Prior to the start of the study, nurses acting as liaisons were given an overview of the study's purpose. Directions for administering the questionnaire, specifically how to treat potential problems involving subject interpretation of items was presented. Nurse liaison's were instructed to have patients answer the questionnaire without the assistance of others and have patients notify the nurse liaison or the researcher if questions arose.

Each of the eight participating hospital nurse liaison's were given twenty-five questionnaires to distribute, to total 200 post myocardial infarction patient questionnaires. Ample time was given to each hospital nurse liaison to distribute questionnaires. Frequent communication with each nurse manager or nurse liaison revealed some difficulty in data collection. Various problems arose which prevented questionnaires from being returned (i.e., nurse failure to return to patient to collect questionnaire; patient discharge; busy nursing units, etc.). Since the number of questionnaires was less than the desired 200, data collection was supplemented by having patients complete 50 additional questionnaires in one large hospital. The Phase II questionnaires were collected from each participating hospital at the end of a three month time period.

Two hundred twenty-five eligible patients were asked to participate. Data from the Phase II questionnaire was collected during the subjects' hospitalization. Five patients declined to participate, and gave no reason for their unwillingness to participate. Twenty patients who agreed to participate in the study were discharged from the hospital and failed to return the questionnaire. Data generated from five subjects was incomplete thus, excluded from the final sample. In addition, the data from one outlier was deleted. The final sample for this study consisted of 194 post myocardial infarction patients.

Completed demographic data were obtained from 132 patients (Appendix F). The descriptive data obtained indicated that the majority 71% of these patients were male. The mean age for this portion of the sample was 61 years with a range of 35 years to 80 years of age. The majority (70%) of the patients were married. Ninety-three percent of the patients indicated that they had no problems with transportation to the respective

cardiac rehabilitation program, and for 96% of the sample the time of the program agreed with their daily schedule. Table 3 provides the summary statistics for the demographic data.

Table 3

Description of the Myocardial Infarction Patient Population

<u>Demographic Variables</u>	<u>N</u>	<u>Frequency</u>	<u>Percent</u>
Sex:			
Male	149	105	70.5
Female		44	29.5
Race:			
White	132	129	97.7
Black		2	1.5
Chinese		1	0.8
Marital Status:			
Married	138	96	69.6
Live Together		5	3.6
Divorced		8	5.8
Separated		3	2.2
Widowed		18	13.0
Single		8	5.8

Human subject protection. Institutional Review Board approval for Phase II of this clinical study was obtained from the University of Rhode Island and the following hospitals in Rhode Island: Rhode Island Hospital, The Miriam Hospital (Appendix G), Roger Williams General Hospital, Pawtucket Memorial Hospital and Kent County Hospital. The following hospitals did not have institutional review boards in place: Landmark Medical Center, Saint Joseph's Hospital (Fatima Unit), Newport Hospital and South County Hospital. However, permission to conduct this study was obtained from designated hospital administrators.

Phase II Questionnaire

The questionnaire for Phase II of the study consisted of salient beliefs and their evaluation of consequences, direct attitude statements regarding participation in an exercise program, normative beliefs and motivation to comply, general subjective norm assessment, a priori beliefs developed from the literature, and a measure of behavioral intention. These measures are described in the following section. The beliefs and referents developed via elicitation are contained in Appendix C and have been discussed in Phase I.

Measurement of salient beliefs. As previously mentioned in Phase 1, eight salient beliefs were elicited. The strength of the salient beliefs was assessed using a bipolar scale indicating the likelihood that performing a behavior will result in a given outcome. To fully comprehend the indirect attitude component, the evaluation of the consequences of the behavior must also be assessed. This measure was obtained using a bipolar scale with anchor endpoints of "good" to "bad". These items are then multiplied together to comprise the indirect attitude score. The indirect attitude measures are given in Sections I and II of the questionnaire in Appendix D.

Direct measurement of attitude. A component of attitude specified by Ajzen and Fishbein (1980) is the direct measure or sometimes referred to as the general assessment of attitude. The researcher chose three adjective pairs that tapped three distinct aspects of exercise in a cardiac rehabilitation program to measure direct attitude. For attitude, the direct measure is given in Section III of the questionnaire in Appendix D.

Measurement of indirect subjective norm. As previously discussed in Phase I, three salient referents were elicited. The strength of the normative belief concerning the referent was assessed using a bipolar scale with anchor items "I should" and "I should not." These anchor items represent normative expectations of significant others. To fully understand subjective norm, the motivation to comply with the referent must also be assessed. This measure was obtained using a unipolar scale ranging from "not at all" to

"very much" to capture the individual's general motivation to comply with the referent. These items are then multiplied together to comprise the indirect subjective norm score and can be found in Sections IV and V of the questionnaire in Appendix D.

General subjective norm assessment. As with attitude, Ajzen and Fishbein (1980) specify a general component of subjective norm or the direct measure of subjective norm. This measure was obtained to evaluate an individuals general perception of what most important others think "should" or "should not" be done in reference to the behavior. This measure can be found in Section VI of the questionnaire in Appendix D.

The a priori beliefs. Ajzen and Fishbein (1980) also presented an alternative method of obtaining salient beliefs to be included in the final questionnaire. They suggested presenting fixed statements derived from the literature or actual patient statements obtained from a sample of the population as an additional method for obtaining salient beliefs. In the case of post myocardial infarction patients the literature indicated they exhibited a pattern of affective responses post infarction. The most frequently elicited emotional responses were: anxiety, depression, feelings of invalidity, perceived uncertainty, partial/total denial, decreased self-esteem and negative body image (van Dixhoorn, Duivenvoordin, Pool, & Verhage, 1990; Harick & Maeland, 1990; Kregler, Dimsdale, Hartley & Sherwood ,1990; Webster, & Christman ,1988; Cassem & Hackett, 1973). Each affective theme expressed by the post myocardial infarction patients in the literature was reviewed. The emotional responses derived from the literature and elicited from patients were translated and rephrased by the researcher into a priori belief statements. Consequently, seven a priori belief statements were developed by the researcher. The a priori statements were grouped into themes as in the salient belief section. The seven a priori belief statements are contained in Table 4 and are given in Section VIII of the questionnaire in

Appendix D. Thus, the resultant beliefs for Phase II were derived from the elicited salient beliefs of the open-ended questionnaire and the a priori belief statements.

Table 4

A PRIORI BELIEF STATEMENTS

My participation for the next twelve weeks in an cardiac rehabilitation exercise program would:

1. Not be necessary because I am in good physical condition.
2. Probably bring on an early death.
3. Be unlikely since I don't have the energy or physical stamina to exercise.
4. Not be necessary because I would rather exercise by myself than participate in a group exercise program.
5. Be unlikely since I need to take it easy from now on.
6. Not be necessary because I may not be able to return to work after my heart attack.
7. Not be necessary since I am not the person I was before my heart attack.

Measurement of behavioral intention. Behavioral intention was assessed by a single item as found in Section VII of the questionnaire in Appendix D. A measure of behavioral intention was obtained to determine the likelihood of a patient enrolling in a cardiac rehabilitation program.

Instrument Scoring

Specifically, the Phase II questionnaire (Appendix D) was comprised of eight sections: section I consisted of the indirect attitude component that dealt with the belief strength; section II the indirect attitude component dealt with the evaluation of outcomes associated with the behavior; section III the direct attitude component toward the behavior; section IV the indirect subjective norm component dealt with the normative beliefs; section V the indirect subjective norm component concerned the motivation to

comply with referents; section VI the direct subjective norm component; section VII the behavioral intention component, and section VIII the a priori belief statements.

Measures of Indirect Attitude

The indirect measures of attitude were obtained by multiplying the strength of the beliefs about exercise participation by the evaluation of the consequences of exercise participation behavior and then the summed products provided a score for the eight beliefs. Each item score could range from -9 to 9. The potential sum could range for all eight beliefs from -72 to 72.

Direct Attitude Measure

In contrast, the direct attitude score was obtained by the sum of the responses to three 7 point semantic differential bipolar adjective pairs scored on a scale from -3 to 3. This potential sum of the three adjective pairs could range from -9 to 9 (Sections I, II and III of the questionnaire in Appendix D depict the direct and indirect attitude measures).

Indirect Subjective Norm Measure

Scores for normative beliefs were obtained from responses on a 7 point bipolar scale. The motivation to comply was obtained from responses on a unipolar scale. To obtain the indirect measure of subjective norm, the three normative beliefs were multiplied by the corresponding motivation to comply and then summed as with the indirect attitude measure to form the indirect subjective norm score. Each item score could range from -3 to 3. This potential sum score could range from -27 to 27.

General Subjective Norm Assessment

The direct subjective norm was obtained from a single item that captured the patients perception of what people important to the patient think should be done in regard to the behavior. The score for this item could ranged from -3 to 3 (Sections IV, V and VI of the questionnaire in Appendix D depict the direct and indirect subjective norm measures).

The A Priori Beliefs

The a priori beliefs were obtained from responses on a 7 point bipolar and 7 point semantic differential scale, respectively. The multiplicative products were summed as with the indirect attitude and subjective norm component. Each item score could range from -9 to 9. This sum score could potentially range from -63 to 63 (Section VIII of the questionnaire in Appendix D).

Behavioral Intention

Behavioral intention was assessed, as previously mentioned, using a single item, "Do you plan to enroll in a cardiac rehabilitation exercise program in 4 to 6 weeks?". This measure was assessed using a bipolar scale with anchor items likely to unlikely (Section VII of the questionnaire in Appendix D).

Behavior

Exercise participation was assessed at the completion of a three month cardiac rehabilitation exercise program by the number of sessions patients attended in the program. The possible range from 0 to 36 reflected the number of sessions attended to complete participation in the cardiac rehabilitation exercise program.

Measures

Beliefs, BE1 through BE8 reflect the eight salient beliefs elicited in Phase I. Beliefs, BE9 through BE15 reflect the a priori beliefs generated from the literature. Direct measures of attitude (ATT1, ATT2, and ATT3) reflect the direct assessment of attitude. Subjective norm (SN1, SN2, and SN3) represent the three salient referents elicited in Phase I. The direct measure of subjective norm (GSN) presents the general subjective norm assessment. Behavioral intention (BI) represents the behavioral intention item to enroll in a cardiac rehabilitation exercise program. Listed on the following page are the measures derived during Phase I, appraised in Phase II, and discussed in Table 5.

- BE1 Help to increase and strengthen my heart muscle.
 BE2 Increase my confidence regarding my physical condition.
 BE3 Have no bad effects.
 BE4 Get me back in good physical shape.
 BE5 Produce stress from fear that exercise can cause another heart attack.
 BE6 Prepare me for my regular daily routine.
 BE7 Help me to realize that exercise under supervision is healthy, not dangerous.

Be dangerous so soon after a heart attack.

- BE9 Not be necessary because I am in good physical condition.
 BE10 Probably bring on an early death.
 BE11 Be impossible since I don't have the energy or physical stamina to exercise.
 BE12 Not be necessary because I would rather exercise by myself than participate in a group exercise program
 BE13 Be unlikely since I am unable to exercise due to my heart attack and need to take it easy.
 BE14 Not be necessary because I may not be able to return to work after my heart attack.
 BE15 Not be necessary since I am not the whole person I was before my heart attack.

In general, I think that exercise in a cardiac rehabilitation program is:

- ATT1 Good _____ Bad
 ATT2 Wise _____ Foolish
 _____ Pleasant _____ Unpleasant

- SN1 My family thinks.
 SN2 My physician thinks.
 _____ My friends think.

In general, most of the people or groups that are important to me think.

- BI I intend to exercise in a cardiac rehabilitation program in four to six weeks after my heart attack.

Results

Descriptive Findings of Beliefs

Table 5 presents the means and standard deviations for the 15 belief statements, direct attitude, subjective norm, general subjective norm and behavioral intention. The descriptive data was interpreted to assess if the item analyses supported the conceptual responses. In Table 5 it can be seen that beliefs, BE1, BE2, and BE7 which dealt with the physical status of the patients received positive endorsement by the subjects. Beliefs, BE3, BE4 and BE6 which dealt with resuming a healthy lifestyle also received positive endorsement by the subjects. These belief statements reflected a positive outcome of exercise in a cardiac rehabilitation program. However, beliefs, BE5 and BE8 reflected stress and danger associated with a cardiac rehabilitation exercise program. It can be seen that in general patients negatively endorsed these beliefs (i.e., they did not believe that exercise would cause another heart attack or would be dangerous coming soon after the original heart attack).

The a priori belief statements 9-15 were comprised of a group of beliefs that connoted disinclination to an exercise program. However, in this sample, patients negatively endorsed the a priori beliefs, that is they negated belief items that suggested a negative outcome (e.g., they responded that it would be unlikely that they would not exercise because of a lack of physical stamina).

The direct attitude measures were positively endorsed by the patients (Table 5). Patients regarded exercise in a cardiac rehabilitation program to be good, wise, and pleasant with pleasant the least favored of all responses. No subject negatively endorsed the good-bad outcome of a cardiac rehabilitation exercise program.

The subjective norm indirect measures were also positively endorsed by patients, as were the direct, general subjective norm measure. Patients regarded family, physician, and friends, respectively, as influential in deciding to exercise in a cardiac rehabilitation program. The physician subjective norm received no negative endorsements by subjects.

The behavioral intention item to enroll in a cardiac rehabilitation exercise program was also positively endorsed by patients. In general, patients appraised the positively phrased belief items favorably and denied the negatively phrased belief items. Subjective norm items were favorably endorsed and patients indicated that they intended to enroll in a cardiac exercise program. However, subjects failed to complete all items of the a priori belief statements. The N for Table 5 was 194 with the exception of the a priori beliefs, where the N ranged from 174 to 194.

Table 5

Descriptive Statistics for Beliefs, Direct Attitude, Direct and Indirect Subjective Norm

Beliefs	BE	Mean	SD	Range of Scores	
				Minimum	Maximum
1		2.3	1.1	-3	3
2		2.3	1.1	-3	3
3		1.2	1.9	-3	3
4		2.2	1.0	-3	3
5		-0.8	2.0	-3	3
6		2.1	1.1	-3	3
7		2.4	1.0	-3	3
8		-1.3	1.7	-3	3
9		-1.8	1.7	-3	3
10		-2.4	1.3	-3	3
11		-1.7	1.6	-3	3
12		-1.5	2.0	-3	3
13		-1.6	1.7	-3	3
14		-1.8	1.7	-3	3
15		-1.8	1.7	-3	3
Direct Attitude (ATT)					
1		2.6	0.6	1	3
2		2.5	0.7	-2	3
3		2.0	1.2	-2	3
Indirect SN (SBN)					
1		2.1	1.3	-1	3
2		2.4	1.2	0	3
3		1.9	1.3	-3	3
Direct SN (GSN)					
		2.1	1.1	-2	6
Behavioral Intention (BI)					
		2.0	1.4	-1	3

Evaluation of outcomes. Table 6 presents the means and standard deviations for the evaluative component (EV) of the 15 belief items and the motivation to comply (MC) component for the three subjective norm items. The evaluative component contributes to the person's attitude in proportion to the strength of his/her beliefs (Ajzen & Fishbein, 1980, p. 222-223). As seen in the evaluation measures, EV1, EV2 and EV7 reflect positive endorsement by the subjects, (i.e. increasing and strengthening the heart muscle, increasing confidence, and awareness that exercise is healthy not dangerous are viewed as positive outcomes). Belief evaluation, EV3, EV4 and EV6 were also positively endorsed by the subjects and viewed as positive outcomes.. On the other hand, the generally negative belief evaluations, (EV5, EV8) which reflected harm as an outcome and the a priori statements, (EV11-15), stimulated a wide range of responses. Notably, scores in five of the a priori items (EV11-15) yielded distributions that were not unimodal suggesting less consensus.

Table 6

Descriptive Statistics for Evaluation of Beliefs and Motivation to Comply

No.	Mean	SD	Range of Scores	
			Minimum	Maximum
1 EV (Evaluation of	2.5	0.8	-3	3
2 EV outcome)	2.5	0.8	-3	3
3 EV	1.9	1.4	-3	3
4 EV	2.4	0.8	-1	3
5 EV	-0.3	2.0	-3	3
6 EV	2.2	1.0	-3	3
7 EV	2.5	0.9	-1	3
8 EV	-0.3	2.0	-3	3
9 EV	0.5	2.3	-3	3
10 EV	-0.8	2.3	-3	3
11 EV	-0.1	2.2	-3	3
12 EV	0.4	2.2	-3	3
13 EV	-0.1	2.1	-3	3
14 EV	-0.3	2.2	-3	3
15 EV	-0.5	2.2	-3	3
1 MC (Motivation to	1.8	1.4	-2	3
2 MC Comply)	2.3	1.0	-3	3
3 MC	1.1	1.6	-3	3

The motivation to comply component contributes to the patients willingness to comply with the referents wishes. The data suggested patients were motivated to comply with their family (MC1), physician (MC2), friends (MC3), respectively. The N for Table 6 ranged from 121 to 181 for the a priori beliefs.

The 15 beliefs were multiplied by their respective evaluative components. The same procedure was done with normative beliefs and motivation to comply. Products represented indirect measures of attitude and subjective norm. Table 7 presents the means, standard deviations and range of scores for the individual items that comprise the indirect attitude and subjective norm indices.

Table 7

Descriptive Statistics for Indirect Attitude and Subjective Norm

No.	Mean	SD	Range of Scores	
			Minimum	Maximum
INDATT 1	6.4	3.0	-6	9
2	6.3	3.0	-9	9
3	3.4	4.9	-9	9
4	5.6	3.3	-9	9
5	2.0	4.5	-9	9
6	5.3	3.6	-9	9
7	6.4	3.5	-9	9
8	1.6	4.9	-9	9
9	0.4	6.2	-9	9
10	2.6	6.5	-9	9
11	1.3	5.7	-9	9
12	1.5	5.8	-9	9
13	1.1	5.5	-9	9
14	1.1	5.7	-9	9
15	1.9	5.8	-9	9
IND SN				
1	4.5	4.2	-9	9
2	5.9	3.9	-9	9
3	3.2	4.0	-9	9

INDATT Indirect Attitude

IND SN Indirect Subjective Norm

INDATT represents the product derived from beliefs by evaluation of consequences. The INDATT statements 1-15 are listed on page 93 in the BE format.

Indirect measures of attitude. In this study all indirect attitudes, with the exception of INDATT1, ranged from -9 to 9. The indirect attitude measures are similar to the belief measures, where the multiplicative products with the highest means were indirect attitude, INDATT1, INDATT2, INDATT6 and INDATT7 which reflected exercise in a cardiac rehabilitation program will aid in the recovery process. The indirect attitude, INDATT3 which stated cardiac rehabilitation exercise programs have no bad effects was positively endorsed but to a lesser extent than the other positive beliefs. Again the indirect attitude, INDATT5 and INDATT8 received negative responses, yet resulted in a positive endorsement due to the multiplicative process in this index.

The a priori attitude measures (INDATT9-15) also received negative responses in regard to exercise in a cardiac rehabilitation program yet, resulted in positive endorsements due to the multiplicative process. Specifically, indirect attitude, INDATT9 which stated, "exercise may not be necessary due to a healthy physical condition," received the lowest mean score of .4, which indicated patients disagreed with this item. The N for the a priori belief indirect measures ranged from 123 to 138 (Table 7).

Indirect measure of subjective norm. The indirect subjective norm index which encompassed the motivation to comply component multiplied by the referent, revealed the family, physician, and friend, respectively, to be positively endorsed. The physician referent received the highest mean score (Table 7).

Principal Component Analysis

Two sets of principal component analyses (PCA) were done to examine the factorial structure of items for, (1) belief components and (2) indirect attitude components.

Belief components. Given the Phase II data, a principal component analysis (Stevens, 1986; Duntzman, 1989) was conducted to: (1) determine if the sets of beliefs and indirect attitudes were unidimensional or not, (2) to delete items which did not contribute to any well-identified component, and (3) to identify the dimensions measured

within the belief index and indirect attitude index. Item and reliability analyses assisted in determining which items best related to the identified dimensions.

An initial PCA utilizing the SPSSX program and varimax rotation was performed on the 15 beliefs. The decision rule for item retention included a factor loading of at least .40 with this loading being at least .10 or greater than loadings on any other component (Guadagnoli & Velicer, 1988). The Scree Test was used to determine the correct number of components to retain. Four components were retained. However, one component was composed of a single item, therefore, a three component solution was determined to represent the best data fit. Consequently, a second PCA specifying a three component solution was conducted. The results of the varimax rotation for the belief items (Table 8) suggested that the three components be labeled: Component 1, recuperation; Component 2, disinclination; and Component 3, confidence.

Beliefs, BE1, BE2, BE4, BE6 and BE7 loaded on the recuperation component (BERECUP) (Table 8). These beliefs centered on the resumption of a previous healthy lifestyle. Beliefs, BE9 and BE11 through BE15 loaded on the disinclination component (BEDISIN).

Table 8

Varimax Rotation Component Pattern for 15 Belief Statements

	Component 1 BERECUP	Component 2 BEDISIN	Component 3 BECONFI
BE1	.845	-.124	-.121
BE2	.821	-.142	-.079
BE3	.074	-.339	-.028
BE4	.769	-.024	-.144
BE5	-.065	-.014	.678
BE6	.822	-.077	-.048
BE7	.727	-.174	-.073
BE8	-.134	.151	.754
BE9	-.174	.698	-.118
BE10	-.187	.262	.606
BE11	-.056	.587	.515
BE12	-.323	.714	-.016
BE13	-.033	.715	.273
BE14	.023	.629	.416
BE15	-.003	.679	.292
Variance	31.6%	16.4%	8.4%

These beliefs focused on dissuasion toward a cardiac rehabilitation exercise program. Beliefs, BE5, BE8 and BE10 loaded on the confidence component (BECONFI). These three beliefs perceived a cardiac rehabilitation exercise program to be associated with myocardial fear or the potentially harmful effects of exercise. However, statements were phrased as negations of these fears, so were scored in a positive direction. Therefore, this was believed to represent a confidence component.

The three components of this PCA accounted for 56.3% of the variance of the belief items. Fourteen of the 15 belief items met the criteria for item retention and were included in the second PCA. BE3 did not load on any of the three components. The three belief components and respective statements which loaded on each component are as follows:

FIGURE 1: Belief statement loadings of belief principal component analysis.

RECUPERATION

BERECUP

BE1	=	Help to increase and strengthen my heart muscle.
BE2	=	Increase my confidence regarding my physical condition.
BE4	=	Get me back in good physical shape.
BE6	=	Prepare me for my regular daily routine.
BE7	=	Help me to realize that exercise under supervision is healthy, not dangerous.

DISINCLINATION

BEDISIN

BE9	=	Not be necessary because I am in good physical condition.
BE11	=	Be impossible since I don't have the energy or physical stamina to exercise.
BE12	=	Not be necessary because I would rather exercise by myself than participate in a group exercise program.
BE13	=	Be unlikely since I am unable to exercise due to my heart attack and need to take it easy.
BE14	=	Not be necessary because I may not be able to return to work after my heart attack.
BE15	=	Not be necessary since I am not the whole person I was before my heart attack.

CONFIDENCE**BECONFI**

BE5	=	Produce stress from fear that exercise can cause another heart attack.
BE8	=	Be dangerous so soon after a heart attack.
BE10	=	Probably bring on an early death.

Indirect attitude components. Table 9 presents the results of a second PCA with a varimax rotation for the 15 indirect attitude measures. The same decision rules applied in this analysis. The results of the varimax rotation for the 15 indirect attitude measures suggested three components as determined by the Scree Test. Indirect attitudes, INDATT9 through 15 loaded on a disinclination component. Indirect attitudes, INDATT1, INDATT2, INDATT4, INDATT6 and INDATT7 loaded on a recuperation component. Indirect attitudes, INDATT3, INDATT5, and INDATT8 loaded on the confidence component. Subjects tended to negate items that indicated myocardial fear or stressful aspects of exercise, (i.e. INDATT3, no bad effects, INDATT5, produce stress from fear that exercise can cause another heart attack, and INDATT8, be dangerous so soon after a heart attack). The three components of this PCA accounted for 64.5% of the variance.

Table 9

Varimax Rotation Component Pattern for 15 Indirect Attitude Measures

	Component 1 INDISIN	Component 2 INDRECUP	Component 3 INDCONFI
INDATT1	.109	.824	.098
INDATT2	-.047	.708	.188
INDATT3	-.033	.008	.814
INDATT4	-.030	.734	.118
INDATT5	.386	.198	.612
INDATT6	-.066	.842	-.009
INDATT7	-.116	.812	-.068
INDATT8	-.107	.088	.571
INDATT9	.814	-.051	.032
INDATT10	.720	-.076	.136
INDATT11	.805	.103	-.083
INDATT12	.786	-.059	-.080
INDATT13	.921	-.000	-.022
INDATT14	.844	-.099	.138
INDATT15	.900	-.040	-.083
	33.7%	21.6%	9.3%

The three components and the respective statements which loaded on each component are as follows:

FIGURE 2: Indirect attitude statement loadings for indirect attitude PCA***DISINCLINATION*****INDISIN**

- INDIATT9 = Not be necessary because I am in good physical condition.
INDATT10 = Probably bring on an early death.
INDATT11 = Be impossible since I don't have the energy or physical stamina to exercise.
INDATT12 = Not be necessary because I would rather exercise by myself than participate in a group exercise program.
INDATT13 = Be unlikely since I am unable to exercise due to my heart attack and need to take it easy.
INDATT14 = Not be necessary because I may not be able to return to work after my heart attack.
INDATT15 = Not be necessary since I am not the whole person I was before my heart attack.

RECUPERATION

INDRECUP

INDATT1	=	Help to increase and strengthen my heart muscle.
INDATT2	=	Increase my confidence regarding my physical condition.
INDATT4	=	Get me back in good physical shape.
INDATT6	=	Prepare me for my regular daily routine.
INDATT7	=	Help me to realize that exercise under supervision is healthy, not dangerous.

CONFIDENCE

INDCONFI

INDATT3	=	Have no bad effects.
INDATT5	=	Produce stress from fear that exercise can cause another heart attack.
INDATT8	=	Be dangerous so soon after a heart attack.

Descriptive Summary of Scales

The indirect attitude set along with subjective norm measures were selected to test the study hypotheses. Indirect attitude components were chosen because: (1) the 3 indirect attitude components accounted for substantially more of the variance than the 3 belief components in the PCA's, and (2) the individual component loadings were greater.

Table 10 presents means, standard deviation, ranges and internal consistency (Cronbach alphas) for the three indirect attitude components (INDISIN, INDRECUP, INDCONFI), the direct measure of attitude (ATT), the direct measure of subjective norm (GSN), the composite of the three normative beliefs (SBN) and behavioral intention (BI). Cronbach's coefficient alpha, (Anastasi, 1988; Nunnally, 1978) was used to evaluate the internal consistency of the scales. It can be seen from Table 10 that the alpha value for the indirect attitude scales ranged from .47 to .92. The INDRECUP scale revealed a favorable attitude toward exercise while INDISIN and INDCONFI scales exhibited lower but favorable scores. INDCONFI scale's alpha value of .47 represents a limitation caused by different types of item content. The INDISIN scale exhibited high internal consistency of .92. The a priori indirect attitudes 9 through 15 comprised this scale. All of these attitudes reflected dissuasion toward exercise or connoted negative outcomes of

exercise. With the exception of the INDCONFI scale all indirect attitude components represented excellent alpha values.

Table 10

Standard Deviations, Ranges and Internal Consistency Values for Study Scales

Scale	Mean	SD	Range	Cronbach Alpha
INDIRECT				
INDISIN	1.3	4.74	-9.00 to 9.00	.92
INDRECUP	6.0	2.65	-9.00 to 9.00	.87
INDCONFI	2.4	3.48	-9.00 to 9.00	.47
SBN	4.6	3.40	-9.00 to 9.00	.98
DIRECT				
ATT	2.3	0.67	-3.00 to 3.00	.67
GSN	2.1	1.40	-3.00 to 3.00	
BI	2.0	1.40	-3.00 to 3.00	

The direct attitude scale (ATT) consisted of three items. It can be seen from Table 10 that most of the subjects had favorable attitudes regarding exercise in a cardiac rehabilitation program. The scales coefficient alpha of .67 resulted from the three items with different experiential endpoints.

The indirect subjective norm scale (SBN) consisted of the 3 subjective norm items. SBN represented the mean of three normative beliefs. The alpha coefficient for this scale was .98. This indicated that the subjects had a substantial amount of agreement regarding the importance of the three referents.

Chapter VI: Phase III

Purpose and Design

The purpose of Phase III was to test the ability of the scales developed in Phase II to predict exercise intentions and participation of post myocardial infarction patients.

Procedure

Subjects and Selection

Phase III of this study entailed determining the validity of the instrument developed in Phase II. Essentially, the hospitals, setting, sample, eligibility criteria and human subjects protection are the same as in Phase II of this study. The instrument refined in Phase II was tested in Phase III of this study. Prospective patients were asked to participate in this study as previously described in Chapter V. Phase III entailed assessing enrollment, number of sessions attended, and completion of a 36 session cardiac rehabilitation exercise program. The usual medical care was provided by physicians concerning participation in an exercise program. Physicians were notified of their patients enrollment, an exercise stress test was given, and progress reports were sent to all physicians.

Patients were entered into respective rehabilitation programs at various times based on the occurrence of their infarction. Each cardiac rehabilitation nurse assessed exercise participation by attendance (number of days absent) and program completion. The researcher, at a specified time, obtained all data from the respective cardiac rehabilitation program nurse to complete Phase III of this study.

Design

A predictive design was used in Phase III. Two hypotheses based on the theory of reasoned action were developed to study intention to enroll and participation behavior in a cardiac rehabilitation exercise program. The level of significance was set at $p < .05$ to test the study hypotheses.

Hypothesis I: Attitude and subjective norm measured by the direct and indirect indices will significantly predict the behavioral intention to enroll in a cardiac rehabilitation exercise program.

Hypothesis II: Attitude and subjective norm measured by the direct and indirect indices will significantly predict participation behavior in a cardiac rehabilitation exercise program.

Table 11

Descriptive Statistics For Behavioral Intention and Exercise Participation

	Mean	SD	Possible Range	# of Subjects
Behavioral Intention	2.03	1.43	-3 to 3	185
Sessions Attended	34.04	1.9	0 - 36	172

Table 11 presents the mean, standard deviation, range and number of subjects for: (1) behavioral intention to enroll in a cardiac rehabilitation program and (2) the number of sessions attended during the program. One hundred and eighty five patients completed the behavioral intention question. Of the 185 patients, 165 responded positively that they intended to enroll in a cardiac rehabilitation exercise program four to six weeks after their heart attack, five responded "neither" (0) and 15 said it was "unlikely" (-1, -2 or -3) they

would enroll. One hundred and fifty nine patients initiated the program and 157 patients completed the cardiac rehabilitation program. The number of days attended ranged from 22 days to perfect attendance.

Regression Analyses

Four sets of hierarchical regression analyses were performed to test the study hypotheses. Hierarchical regression analysis was employed to ascertain to what extent direct attitude (ATT) and general subjective norm (GSN) explained the behavioral intention to enroll in a cardiac rehabilitation exercise program. The first variable or variable set entered in all equations was the attitude variable because previous exercise research indicated attitude was a more significant predictor of both behavioral intention and behavior than was subjective norm. Table 12 presents the Beta, R squared and F values for the independent variables predicting behavioral intention. Entered first in the equation, direct attitude was a significant predictor accounting for 14% of the variance in behavioral intention.

General subjective norm (GSN) which was entered in the second step did predict behavioral intention (BI) ($p < .001$) with the proportion of variance accounted for by both variables equal to 43%. Thus, the combined measures of the direct attitude (ATT) and general subjective norm (GSN) accounted for 43% of the variance in behavioral intention. The size of the betas (Beta = .37 for ATT; Beta = .60 for GSN) indicated the relatively greater contribution provided by the general subjective norm to behavioral intention.

Hierarchical regression analysis was employed to ascertain to what extent the indirect attitude measures (INDISIN, INDRECUP, INDCONFI) and indirect subjective norm (SBN) explained BI (Table 12). The three indirect attitude scales as a set significantly predicted BI ($F = 5.76, p < .001$) (See lower portion of Table 12). Of these three scales, INDRECUP had the largest beta of .32. Beta weights for INDISIN and

INDCONFI indicate that they contributed little to the prediction of behavioral intention. The three normative beliefs as a set (SBN) improved this prediction significantly ($F = 15.4, p < .000$). The two indirect components explained 31% of the variance in behavioral intention. The first study hypothesis was accepted in the case of the direct and indirect attitude and subjective norm indices.

Table 12

Prediction of Behavioral Intention by Direct and Indirect Indices

Variable	Independent Variable	Standardized Beta	R ²	F	p
BI	ATT	.37	.14	29.08	.000
	GSN	.60	.43	68.50	.001
BI	INDISIN	.06	.11	5.76	.001
	INDRECUP	.32			
	INDCONFI	-.05			
	SBN	.47	.31	15.4	.000

Hierarchical regression analysis was employed also to ascertain to what extent attitude and general subjective norm explained attendance in a cardiac rehabilitation program. Exercise participation was measured by the number of sessions attended in the cardiac rehabilitation program. Table 13 presents the Beta, R squared and F value for the independent variables predicting exercise participation in a cardiac rehabilitation program. Again based on prior exercise research, the first entered variable or variable set was the direct attitude variable (ATT). Direct attitude was not a significant predictor for exercise (Beta = .03). Direct attitude predicted less than 1% of exercise participation behavior.

General subjective norm (GSN) was entered on the second step. It failed to produce a significant prediction (Beta = -.11). Taken together, the direct attitude and

general subjective norm indices were able to account for just over 1% of the variance in exercise participation.

Hierarchical regression was also employed to determine to what extent INDISIN, INDRECUP, INDCONFI, and SBN explained exercise participation (Table 13). The three indirect attitude scales were entered first into the regression equation as a set, but did not significantly predict attendance at exercise sessions (Beta = -.10, .00, -.09 respectively, for the three indirect scales). The three indirect attitude set of variables predicted only 2% of exercise participation behavior.

The three normative beliefs as a set (SBN) did not improve this prediction (Beta = .02). The indirect attitude and indirect subjective norm indices together were able to account for 2% of the variance in exercise behavior. The second study hypothesis was rejected in the case of both direct and indirect attitude and subjective norm indices

Table 13

Prediction of Program Participation by Direct and Indirect Indices

Dependent Variable	Independent Variable	Standardized Beta	R ²	F	p
Exercise Participation	ATT	.03	.001	.18	NS
	GSN	-.11	.011	.95	NS
	INDISIN	-.10	.02	.85	NS
	INDRECUP	.00			
	INDCONFI	-.09			
	SBN	.02	.10	.64	NS

A comparison of the direct and indirect measurement procedures found the direct attitude and general subjective norm to be slightly superior to the indirect assessment (Beta= .37 ATT; .60 GSN) compared to (Beta= .06 INDISIN, .32 INDRECUP, -.05 INDCONFI ; .47 SBN in Table 12) for behavioral intention. Most of this superiority,

was attributable to the general subjective norm component. Exercise participation could not be predicted, either by attitude or subjective norm, measured directly or indirectly.

Chapter VII

Discussion, Conclusions, Implications, and Recommendations

This study was conducted in three phases. In Phase I beliefs and referents were elicited, from patients who had a previous myocardial infarction, regarding exercise in a cardiac rehabilitation program. Drawing on data generated in Phase I, Phase II consisted of developing a preliminary inventory and administering it to 194 post myocardial infarction patients. A principal component analysis was performed and the instrument was refined. Phase III tested the ability of the scales developed in Phase II to predict exercise intentions and participation of the post myocardial infarction patient in a cardiac rehabilitation program. The discussion section will be organized around the findings of the three phases of this study. Specific methodological issues which may have impacted the findings will be addressed. The conclusions of this study, the implications for nursing practice and recommendations for future research will be discussed.

Phase I

The model and methods of Ajzen and Fishbein (1980) provided a theoretically sound approach to unveiling post myocardial infarction patient's beliefs regarding exercise in a cardiac rehabilitation program. From the seven open-ended questions recommended by Ajzen and Fishbein (1980) patients identified eight similar beliefs in regard to physical, psychological and social concerns across the four periods of data collection in Phase I. The findings of Phase I of this study indicated that of the eight salient beliefs elicited, six reflected the positive aspects of resuming physical activity following a heart attack. One belief suggested that psychological security was a crucial element, and two of the eight beliefs reflected fear that exercise could induce a reoccurrence of a cardiac event. Data generated in regard to subjective norm showed that

patients across all four periods identified family, physician, and friends, respectively as their most salient referents.

Phase II

The Phase II questionnaire was developed to measure: (1) the strength and evaluation of the eight salient beliefs, elicited in Phase I of this study, (2) the normative beliefs and the motivation to comply with the wishes of the salient referents identified in Phase I, (3) the strength and evaluation of the a priori beliefs derived from literature, (4) direct attitude, (5) general subjective norm, and (6) behavioral intention to enroll in a cardiac rehabilitation program. Phase II of this study entailed: (1) item analyses, (2) instrument refinement, in which a principal component analysis was done to determine the dimensionality of the fifteen beliefs and their related attitude measures of the instrument, and (3) tests of internal consistency. Descriptive statistics were done on the direct and indirect measures of the theory to identify the favorable or unfavorable patient responses to the various items. The principal component analysis revealed three distinct components. One component reflected recovery. In general, the items in this component suggested that post myocardial infarction patients believed their physical status would be improved, and the ability to resume their previous lifestyle would be enhanced through participation in a cardiac rehabilitation exercise program. A second component which reflected reticence to engage in exercise was labeled disinclination. Data generated from items (INDATT9-15) of this component indicated that the subjects disagreed with those beliefs which reflected disinclination toward exercise. A third component, labeled confidence was comprised of items that suggested myocardial fear. Interestingly, patients tended to negate the items concerned with stress or fear of another myocardial infarction.

Phase II also entailed evaluation of the indirect attitude and subjective norm indices. The indirect attitude items derived from the eight salient beliefs were favorably endorsed by the subjects. The evaluative component of the attribute contributes to the individual's attitude in proportion to the strength of his/her beliefs. Similarly, the

motivation-to-comply component also contributes to the individual's willingness to comply with the referent. Both the direct and indirect subjective norm items were favorably endorsed by subjects. Mainly, patients had positive attitudes toward exercise and were inclined to perform what they perceived their significant others would have them do.

To refine the developed instrument the belief items and the indirect attitude index were subjected to a principal component analysis. From the two principal component analyses that examined the belief and the indirect attitude statements, the results of the indirect attitude principal component analysis was selected as predictor variables to test the study hypotheses because : (1) the three indirect attitude components accounted for substantially more of the variance, and (2) the individual component loadings were greater.

The first component, disinclination, had the highest loading. Items in this component were concerned with unfavorable dispositions toward enrollment and exercise participation. Items such as, "I don't have the energy or physical stamina to exercise" or "I am unable to exercise due to my heart attack, I need to take it easy" inferred a sense of *disinclination*.

The second component can be considered a recovery component. It consisted of items such as "Exercise in a cardiac rehabilitation program will help to increase and strengthen my heart muscle" ; "Get me back in good physical shape". This component supports the concept of *recuperation*.

The essence of the third component confidence, consisted of a myocardial fear dimension. Two of the items loading on this component involved myocardial fear. Items such as "A cardiac rehabilitation program produces stress from fear that exercise can cause another heart attack" ; "Be dangerous soon after a heart attack" mainly comprised this component. The third item that loaded on this component "Cardiac rehabilitation program will have no bad effects" was inversely related in meaning to the other two

items. This item received the highest loading and inferred a sense of *confidence*.

Of all the beliefs about exercise in cardiac rehabilitation program the three components consolidated the items and identified specific dimensions relevant to post myocardial infarction patients contemplating exercise. The emergence of three independent components suggested that the ratings of the recuperation scale were unrelated to the ratings given to the confidence scale and the disinclination ratings also were unrelated to either of the other two scales.

A measure of the internal consistency for each of the five scales was computed using Cronbach's alpha procedure. The Cronbach alpha coefficients for the three indirect attitude scales ranged from .47 for confidence to .92 for disinclination. The items of the confidence scale originated from the open-ended question, "What do you believe are the disadvantages of participating in a cardiac rehabilitation program?". A significant number of subjects responded positively to the "No bad effects" item. This item was considered to represent a neutral response because the item does not reflect either a positive nor a negative belief. The other items of this scale reflected stress or fear of another heart attack resulting from exercise in a cardiac rehabilitation program. The disinclination scale's coefficient alpha of .92 supported the consistency of the a priori indirect attitudes. The .87 coefficient alpha for the recuperation scale supported the consistency of the items in this component that reflected recovery. In general, alpha reliabilities for the three indirect attitude scales, the direct attitude, and indirect subjective norm scales indicated a high degree of internal consistency of scale items for all five scales.

There was a moderate relationship between the direct, general subjective norm variable and only the indirect attitude scale, INDRECUP ($r = .26$) and indirect subjective norm and only the INDRECUP scale ($r = .34$). These moderate coefficients suggested somewhat of an association between attitudes toward recuperation and the desire to listen to important others. The patients, as a whole, intended to enroll in exercise participation

in a cardiac rehabilitation program. Later they attended most sessions. Prior exercise research has investigated the theory of reasoned action to predict intentions and exercise participation in a group of participants. However, few empirical studies have tapped the dimensions of a belief inventory to better understand the process post myocardial infarction patients go through to come to a decision regarding enrollment and exercise participation. Within nursing research, only Miller et al. (1982) have developed a Health Attitude Scale designed to assess cardiac patients attitude toward performing recommended behaviors. The findings of this study provide the nurse with areas of concern (e.g. recovery, psychological security, and fear) that may be pertinent to assessment of patients following a myocardial infarction.

Phase III

The purpose of Phase III of this study tested the ability of the developed scales to predict the behavioral intention to enroll in a cardiac exercise program, as well as actual exercise participation. The first hypothesis tested: attitude and subjective norm measured by the direct and indirect indices will significantly predict the behavioral intention to enroll in a cardiac rehabilitation exercise program was supported. The acceptance of the first hypothesis highlights the fact that in a situation of crisis, both attitude and social influence contribute to the decision making process regarding intention to enroll in an exercise program after a myocardial infarction.

In a review of studies that applied the theory of reasoned action to the study of exercise behavior, Godin and Shephard (1990) reported that 13 of 22 studies found 30% of the variance in intentions to exercise explained by attitude (p. 110), and that subjective norm was less consistently associated with intention to exercise. But as the theory postulates (Dzewaltowski et al. 1990, p 339) has noted "that for some behaviors, attitudes will dominate the formation of intentions whereas with other behaviors subjective norm will be a dominant influence." Other researchers that have applied the theory of reasoned

action to the prediction of exercise intentions and participation have generally found that a linear combination of attitude and subjective norm significantly predicted intention to exercise and that attitude contributed more to the prediction of intention than did subjective norm (Dzewaltowski et al., 1990; Dzewaltowski, 1989; Godin & Shepard, 1986b; Riddle, 1980). Similarly, Godin and Shephard (1987), Godin, Cox and Shephard, 1983; Pender and Pender, (1986) and Riddle, (1980) have also found subjective norm to be statistically significant but to a lesser degree than attitude. Valois et al. (1988) attributed these findings to the fact that it is the individuals' decision to exercise or not. However, in this sample of post myocardial patients, the decision was influenced by the situation, where the patient were vulnerable and compliant. They exhibited compliant behavior regarding the intention to enroll, as well as, exercise participation.

The present study supported the literature in that both the direct and indirect attitude and subjective norm measures were significant predictors of behavioral intention to enroll in a cardiac rehabilitation exercise program, however, in contrast to the findings above, subjective norm contributed more to the prediction of intention than attitude. One explanation for this difference in the intention to enroll in a cardiac rehabilitation exercise program, may have been a socially desirable response for this sample of post myocardial infarction patients, who were very positive in their intentions to enroll. Also, in this situation of crisis, patients exhibited a docile attitude that may have predisposed them to be influenced by family, physician and friends. Like, Dzewaltowski (1989), and Dzewaltowski, Noble & Shaw (1990) attitude was a statistically significant predictor of behavioral intention in this study. In contrast with other authors, in this study and Dzewaltowski's work, both general subjective norm and indirect subjective norm, seemed to play a more significant role in the prediction of behavioral intention to enroll in a cardiac rehabilitation exercise program. Similarly, Daltroy and Godin (1989) found subjective norm to be a statistically significant predictor regarding spouses' intentions to

encourage cardiac patients participation in exercise. Other studies have shown that exercise behavior is socially influenced (Carron, Widmeyer, & Brawley (1988); Taylor, Bandura, Ewart, Miller & DeBusk (1985) whereas a modest number of non-health related studies have found subjective norm to mediate behavioral intention more strongly than attitude (Bentler & Speckart, 1981; Kantala et al., 1982; Pagel & Davidson, 1984).

From a different perspective, Daltroy and Godin (1989), found only subjective norm and not attitude to significantly predict intention to encourage spouse participation in a cardiac exercise class. In Daltroy and Godin's study (1989) all other variables (attitude, etc.) added only 2.3% to the total variance explained in intention. Although, few studies have examined the spouse's influence on physical activity, Heinzelman and Bagley, (1970) Nye and Paulsen, (1974) Andrew, Oldridge, Parker, Cunningham, Rechnitzer, Jones, Buck, Kavanagh, Shepard, and Sutton (1981) and Dishman, Sallis, and Orenstein (1985) found the spouse's attitude to be a positive influencing factor for coronary patients to attend and adhere to an exercise program. The present study suggested that strategies to recruit patients into cardiac rehabilitation programs, during the hospital course, be directed toward the underlying beliefs elicited in this study, regarding exercise, as well as, the social role of the family, physician, and friends to encourage lifestyle changes regarding exercise. Consistent with past exercise research, (Dzewatowski, 1989; Godin and Shepard, 1986b; and Wurtele & Maddux, 1987) the present study supported Ajzen & Fishbein's (1980) theory of reasoned action, where direct attitude and subjective norm taken together accounted for 43% of the variance in behavioral intention and also, indirect attitude and subjective norm accounted for 30% of the variance in behavioral intention to enroll in a cardiac exercise program.

Godin and Shephard (1990) state the relationship between subjective norm and intention depends upon idiosyncracies within subsegments of the population under study. In this regard, Ajzen (1985) has maintained that attitude and subjective norm have different effects in the model, depending on the situation under study.

The second hypothesis which tested: attitude and subjective norm measured by the direct and indirect indices will significantly predict exercise participation in a cardiac rehabilitation program was rejected. This finding seemed to result from a condition in which patients, in a situation of crisis, tried to comply with a medical regimen and the wishes of others. A proposed rationale for this finding centers on the group of patients studied. In this study, the post myocardial infarction patients were a homogenous group of patients whose mean scores on behavioral intention and exercise participation displayed a highly skewed distribution. However, while there was sufficient variance in behavioral intention to test the model, that was not the case for the behavior variable, exercise participation. As a group, the patients intended to enroll and indeed, participated in the exercise program. Although the data suggests that less than 1% of the variance was explained by behavioral intention to exercise behavior, direct examination of the frequency distribution indicated that 165 of 185 patients indicated a positive intention to enroll. These findings suggest that lack of variance in the criterion variable, exercise participation behavior, may have obscured the actual findings.

Numerous studies, within exercise research, have investigated both the antecedent-intention and intention-behavior relationship (Godin et al, 1989; Godin & Shephard, 1985; Pender & Pender, 1986; Valois et al 1988) where the intention variance for attitude and subjective norm ranged from $R^2 = .25$ to $.54$. In the present study, a low inverse relationship was found between behavioral intention and attendance in a cardiac rehabilitation program ($r = -.09$). In the case of this study, the lack of variance influenced the findings in regard to exercise participation behavior.

In contrast, this study found both direct and indirect measures of attitude and social influence to predict behavioral intention. Godin and Shephard's (1990) review of attitude-behavior models in exercise promotion, indicated that the findings of this study are consistent with the exercise research literature regarding the linear combination of attitude and subjective norm predicting intention. Unlike previous exercise research,

subjective norm significantly improved the intention prediction. The social support required during this specific patient situation is unquestionable as evidenced in the findings. Moreover, the physician's prescription to enroll in a cardiac rehabilitation program is more likely to occur with positive spousal support and friendly advice as the findings of this study indicated. This result illustrated the power of the social environment, as well as, patient attitude, to shape exercise behavior post myocardial infarction. When efforts are made to recommend exercise in a program, attention should be focused, not only on the patient, but also on those individuals with whom the prospective participant relates to most directly, such as family, physician and friends. The attitudes of the three referents and the way they are perceived, are significant antecedents to the decision-making process, whether to enroll in a cardiac rehabilitation program or not and to partake in exercise or not.

Other Situational Factors

Specific situational factors related to the intention of post myocardial infarction patients participating in a cardiac rehabilitation exercise program were identified during Phase II data collection. Situational factors are defined as variables that are external to the theory that can influence intentions, hence behavior is influenced independently.

The personal opinion of the researcher is reflected in the following observations. Post myocardial infarction patients represented a unique group of patients with various idiosyncracies. More specifically, the personality profile of a myocardial infarction patient was a classic finding. Grounded in the patient interviews in Phase I, post myocardial infarction patients characteristically possessed a sense of time urgency, were compulsive about home and work activities, were driven individuals with impatience as a compelling force and they often performed several activities simultaneously. This fastidious profile may be a determinant to behavioral intent. The stress level of these individuals was moderate to high. Stress produces physiologic responses that result from

Environmental stimuli. Both these crucial factors have been well-researched in the literature and contributed to the findings that patients did what they were told. Post myocardial infarction patients appeared to be a group of individuals who operate from an "all or none" principle. This was manifested in their exercise participation behavior. This sample of patients were a captive group of individuals who experienced a cardiac event that had the potential to be life-threatening. Numerous lifestyle changes were mandated by both physicians and nurses requiring permanent adherence. This situation renders the post myocardial infarction patient vulnerable. Godin and Shephard (1990) indicate that a useful feature of the theory of reasoned action is its ability to identify details of the cognitive profile underlying exercise decision-making in specific populations. The situational factors external to the theory that may have influenced the decision to enroll and participate in the exercise program were: the patients response to the nurse recruiters efforts to enroll them in cardiac rehabilitation programs, the staff nurses educational series of lifestyle changes, family and friends advice and the fear of another myocardial infarction or even death. These variables may have contributed to the significant subjective norm findings. Exercise in a cardiac rehabilitation program is a health behavior under volitional control. In light of this situation and the vulnerable state of the patient, the behavioral intention to enroll in a cardiac rehabilitation program and participate in exercise is not an unexpected finding. However, the inability of attitude and subjective norm to predict exercise participation, in light of the high enrollment and attendance, was attributed to the non-normal distribution of the data. In general, the idiosyncracies and situational factors delineated may explain the patient responses, intentions, and compliant behavior which resulted in Phase III.

Methodological Issues

In general, patients found the Phase II questionnaire too lengthy. This factor contributed to many questionnaires left uncompleted, lost or simply not returned.

Another major problem with the Phase II questionnaire was the level of difficulty in completing the items. Although a simple explanation was provided to all patients, numerous comments were made regarding the difficulty in answering the various sections of the questionnaire. In particular, patients were confused by the repetitiveness of the items, specifically the evaluation items. Many patients reported they had already answered the items in the previous (belief) section. It may be that evaluation items should have been re-worded to reflect the evaluation of the outcome. For example, the belief statement, "Exercise in a cardiac rehabilitation program will increase and strengthen my heart muscle" is easily answered with the likely-unlikely bipolar scale. The corresponding evaluation statement should have read, "Increasing and strengthening my heart muscle in a cardiac rehabilitation program would be "good"... "bad". This clarification may have resulted in less response problems. Also, the a priori belief section posed many patient problems and a significant number of patients did not respond to the items. Of interest, in the a priori beliefs (Section VIII Appendix D) patients were asked to complete the belief and evaluation of belief items together and were not separated out as in the other sections of the questionnaire (Sections I and II). Patients could not comprehend how to answer these items and left them unanswered. In general, the patients experienced difficulty not with the belief statements but with the evaluation of the outcome (Section II Appendix D).

Young, Lierman, Powell-Cope, Kasprzyk, and Benoliel (1991) discussed a number of potential threats to reliability related to the theory of planned behavior. Similarly, the threats apply to the theory of reasoned action. Four threats were examined. The first reliability issue focused on the attitude scores when a specific belief is not endorsed by a participant. For example, most subjects agree with the belief, "Exercise in a cardiac rehabilitation program will help my heart to extract oxygen more efficiently." The problem arises when a respondent does not believe or disagrees with this statement and is asked to evaluate it. The respondent is unsure how to answer this question.

The second issue related again to the evaluation section of the questionnaire. The anchor items of good-bad assumes the respondent holds an absolute opinion regarding that belief without considering the circumstances occurring at that time. The particular life circumstances or the context in which events occur, greatly impact the way items are answered. The third reliability issue pertains to the similarity of the belief and evaluation items. Respondents, as previously mentioned in this study, perceived the items to be the same, potentially answering the items the same without giving any further thought to the items.

Fourth, social desirability was a threat that cannot be underestimated in the health arena. The theory of reasoned action is unable to capture this source of bias. Young et al., (1991) state, "This bias can be amplified when participants are recruited through health care providers" (p. 143). Nurses recruited patients in this study and exercise post myocardial infarction is a health behavior.

Despite the methodological issues raised, the theory of reasoned action possesses utility for predicting health behaviors. The theory of reasoned action continues to be examined to predict selected health behaviors, e.g., breast self-examination (Lierman et al., 1990) and condom use as an AIDS risk behavior among black women (Jemmott & Jemmott, 1991). The theory of planned behavior provides a new dimension to explore when predicting health behaviors, perceived behavioral control. The advantage of additional variables to the theory's predictive validity cannot be underestimated.

This study explored phenomena in the domain of client (Kim, 1983). Specifically, the post myocardial infarction patient population. Explaining human behavior is a difficult task. The theory of reasoned action was an initial attempt and further refined by the theory of planned behavior to explain, understand and predict human behavior. If we knew why patients thought the way they did, nurses would possess a unique body of knowledge no other discipline could explain. It is through

small efforts such as this study, that one large step is taken in the client domain toward understanding, explaining and predicting happenings in clients

myocardial infarction patients. The purpose of this study was to identify the beliefs and attitudes of patients with myocardial infarction who are in a rehabilitation program. The study was designed to identify the beliefs and attitudes of patients with myocardial infarction who are in a rehabilitation program. The study was designed to identify the beliefs and attitudes of patients with myocardial infarction who are in a rehabilitation program. The study was designed to identify the beliefs and attitudes of patients with myocardial infarction who are in a rehabilitation program.

The significance of this study is that it provides a better understanding of the beliefs and attitudes of patients with myocardial infarction who are in a rehabilitation program. The study was designed to identify the beliefs and attitudes of patients with myocardial infarction who are in a rehabilitation program. The study was designed to identify the beliefs and attitudes of patients with myocardial infarction who are in a rehabilitation program.

Implications for Rehabilitation

The purpose of this study was to identify the beliefs and attitudes of patients with myocardial infarction who are in a rehabilitation program. The study was designed to identify the beliefs and attitudes of patients with myocardial infarction who are in a rehabilitation program. The study was designed to identify the beliefs and attitudes of patients with myocardial infarction who are in a rehabilitation program.

Once beliefs and attitudes are identified, they can be used to develop a rehabilitation program that is tailored to the needs of the patient. The study was designed to identify the beliefs and attitudes of patients with myocardial infarction who are in a rehabilitation program. The study was designed to identify the beliefs and attitudes of patients with myocardial infarction who are in a rehabilitation program.

Conclusions

The principle conclusions drawn from the results of this study of 194 post myocardial infarction patients are: (1) post myocardial infarction patients possessed favorable beliefs about a cardiac rehabilitation exercise program; (2) three salient referents were identified who influenced the post myocardial infarction patient in the decision-making process; (3) the indirect measures of attitude revealed three components labeled: disinclination, recuperation, and confidence; and (4) there exists support for applying the theory of reasoned action to predict intention to enroll and participation behavior in a cardiac rehabilitation exercise program.

The significant contribution of the subjective norm construct's prediction to the behavioral intention to enroll in a cardiac rehabilitation exercise program was demonstrated in this study. This predictive ability provides a better understanding of the beliefs and social influence that effect behavior during situations of threat in the myocardial infarction population.

Implications for Nursing Practice

The purpose of Phase I was to elicit beliefs regarding exercise in a cardiac rehabilitation program. The significance of the Phase I findings lies in understanding the patients beliefs regarding exercise after a myocardial infarction and using these findings to facilitate recovery. The importance of the three salient referents suggested that strategies and interventions be designed to target these significant others.

Once beliefs about a particular behavior and the most important social influences are identified, nursing practice can be directed toward the determinants of the specific behavior. Although knowledge of a patient's intention to enroll in a cardiac rehabilitation exercise program is useful in the prediction of adherence to a long term activity. It is interesting to note, the behavior under study required repeated performances (36 sessions) to meet the single behavioral criteria for exercise in a cardiac rehabilitation program. The

numerous lifestyle changes required for this patient population entail repeated actions. The nurse is directly involved in these lifestyle modifications during hospitalization. Knowledge of the patients' responses to the attitude and subjective norm measures regarding exercise in a cardiac rehabilitation program determined two points. The first point is: patients in general believed cardiac rehabilitation was beneficial, however, a nursing intervention is required for the beliefs that reflect unfavorable responses, recognizing the elicited patient fears. Secondly, who is important to the patient. It is those individuals that become part of the strategy to incur a change in behavior.

Moreover, the educational efforts of the nurse at this time should be directed toward the beliefs of patients who do not intend to enroll in a cardiac rehabilitation program. Strategies designed to alter the intention to enroll and subsequent attendance behavior should be developed from the favorable indirect attitude statements elicited in this study. The basic assumption of the theory of reasoned action is that a change in beliefs results in influence over the targeted behavior. The influence attempt or strategy must be directed at the targeted beliefs. Attitudes are thus changed by changing the existing beliefs or as this study suggested, strategies to improve patients' intention to enroll and exercise participation should be directed at the social role, as well as, the inaccurate or unfavorable attitudes toward exercise participation. Beliefs provide the basic foundation upon which strategies to incur a change in behavior are derived. However, this is but the first step in such a complex process. The nurse possesses the given source of knowledge, is the channel by which new information is incurred, captures the patient's attention and provides the persuasive communication. Young et al. (1991) state "an understanding of the factors that influence a health-related behavior is of potential use in the development of preventive nursing approaches" (p. 143).

Recommendations

There is a need to continue to study the theory of reasoned in the search for answers to health-related behaviors. The constructs of the theory of reasoned action possess utility for nurses as they assist patients to recover from illness. Specific recommendations for further research are:

1. To apply and test the theory of reasoned action with another group of cardiac patients, such as the coronary-artery-bypass-graft-patient population, who are in a similar situation as the post myocardial infarction patient, regarding exercise post surgery.
2. To apply and test the theory of reasoned action with post myocardial infarction patients, examining the differences in beliefs, attitudes, and subjective norm between those who intend to exercise after a myocardial infarction with those who do not intend to exercise.

Recommendations for theory development:

1. To further examine the effect of past behavior or habit of exercise as external constructs contributing to the theory of reasoned action.

APPENDIX A

FIGURE 1: Schmitt's (1983) definition of the "Big 5" personality traits

n = number of items
 $AB = \sum_{i=1}^n b_i a_i$
 $i = 1$
 a = number of salient adjectives
 $SN = \sum_{i=1}^n s_i m_i$
 $i = 1$
 n = number of references

n
 $\sum_{i=1}^n b_i a_i$
 $i = 1$
 1
 $\sum_{j=1}^n NB_j MC_j$
 $j = 1$

APPENDICES

b_i = belief that personality adjectives listed in column 1 (below) are related to the trait
 a_i = evaluation of adjective
 a = number of adjectives listed in column 1
 AB = ability score
 NB_j = personality trait score for each of the five personality traits
 MC_j = motivation score for each of the five personality traits
 1 = number of items in column 1
 SN = subjective norm "personality" score (what you do for others)
 BI = behavioral intent
 B = behavior

APPENDIX A

FIGURE 1: Schematic Representation of the Theory of Reasoned Action

$$AB = \sum_{i=1}^n b_i e_i$$

n = number of salient outcomes

$$SN = \sum_{j=1}^n n b_j m c_j$$

n = number of referents

$$AB \quad BI \quad B$$

$$SN$$

- b_i = belief that performing behavior leads to consequent i (belief strength)
 e_i = evaluation of outcome i
 n = number of beliefs in the model
 AB = attitude toward behavior
 NB_j = person's belief that referent j thinks the person should/should not perform the behavior
 MC_j = motivation to comply with referent j
 l = number of salient referents in the model
 SN = subjective norm; "general feeling" about what most people expect
 BI = behavioral intent
 B = behavior

APPENDIX B**QUESTIONS USED TO IDENTIFY SALIENT BELIEFS AND SALIENT
REFERENTS****PHASE I**

1. What do you believe are the advantages of undertaking a cardiac rehabilitation exercise program 4 to 6 weeks after a heart attack?

2. What do you believe are the disadvantages of undertaking a cardiac rehabilitation exercise program 4 to 6 weeks after a heart attack?

3. Do you have any other beliefs regarding a cardiac rehabilitation exercise program 4-6 weeks after a heart attack?

4. What individual or group of people would approve of your participation in a cardiac rehabilitation exercise program 4-6 weeks after a heart attack?

5. What individual or group of people would disapprove of your participation in a cardiac rehabilitation exercise program 4-6 weeks after a heart attack?

6. Which people whom you know other than the ones just listed would be interested in your taking part or not taking part in a cardiac rehabilitation exercise program 4-6 weeks after a heart attack?

7. Of these individuals or group of people, who is most important to you?

APPENDIX C

Table I - C

Results of Phase 1 Questionnaire to Identify Salient Beliefs Question #1:

What do you believe are the advantages of undertaking a cardiac rehabilitation exercise program 4 to 6 weeks after a heart attack?

BELIEF	FREQUENCY
1. Reduces fear of having another heart attack:	2
2. Reduces chance of having another heart attack:	2
3. Reduces chance of further cardiac problems:	1
4. Program makes you feel good:	3
5. Program prepares you for your regular routine:	8
6. Program gives direction to an inactive individual:	1
7. To get in shape:	9
8. Program restores body to be more active:	2
9. Program helps to increase heart muscle/strengthen heart:	12
10. Great program!:	1
11. Program helps to build confidence:	8
12. Program allows you to meet patients similarly situated:	3
13. Program teaches you can exercise safely:	1
14. Program puts structure back in life:	2
15. Security of having exercise medically supervised:	1
16. Exercise helps to prevent blood clots:	1
17. Program helps me psychologically:	3
18. Program helps me understand that there is life after a heart attack:	3
19. None: Already had 7 heart attacks and don't want to overdo it:	1
20. Program helps speed recovery:	3
21. Program improves health:	1
22. Structure allows controlled exercising:	1
23. Contact with medical profession:	1

Table 2-C

Question #2:

do you believe are the disadvantages of undertaking a cardiac rehabilitation
program 4 to 6 weeks after a heart attack?

BELIEF**FREQUENCY**

24. Stress from fear that exercise can cause another heart attack:	8
25. Fear of not being able to perform:	1
26. Something could happen if your body is not ready:	9
27. No disadvantages:	27
28. If no supervision, activities could be excessive or inadequate:	1
29. Be dangerous soon after your heart has been damaged:	1
30. If you can pass a stress test, there shouldn't be any disadvantages:	1
31. Because of program schedule, it's only available to non-working individuals:	8

Table 3-C

Question #3:

Do you have any other beliefs regarding a cardiac rehabilitation exercise program 4 to 6 weeks after a heart attack:

BELIEF	FREQUENCY
32. Should be under supervision by medical personnel:	2
33. Exercise program should start as soon as possible:	3
34. Organized exercise program helps mentally and physically:	1
35. Undisciplined and unathletic must be	1
36. Program keeps you healthy:	1
37. Exercise makes a damaged heart stronger:	1
38. Exercise program helps to dispel myths and fear:	1
39. Exercise program helps person mentally:	2
40. Some guidance about home exercise activities should be added to program:	1
41. Program helps to meet other patients similarly situated:	2
42. Exercise program should begin gradually and thereafter increase:	1
43. Am involved at Atrium:	1
44. "Staying alive":	1
45. "I'm going to do what I want":	1
46. Program should be started 6 to 8 weeks after the heart attack:	1
47. Program is needed to build up your heart again:	1
48. Program builds confidence:	1
49. "Strongly believe in this program":	2
50. "To help get success":	2
51. Continued contact and secure feeling with medical profession:	1
52. "To feel better and return to activity":	1
53. "4 to 6 weeks after heart attack was a good time to start because by then I was anxious to know what I could do without undue stress":	1

Table 4-C

Question #4:

What individual or group of people would approve of your participation in a cardiac rehabilitation exercise program 4 to 6 weeks after a heart attack?

BELIEF	FREQUENCY
1. None:	2
2. Spouse:	11
3. Unknown:	0
4. Family:	26
5. Children:	8
6. Friends:	14
7. Doctor:	22
8. Nurses:	4
9. APC - 2 Program:	1
10. American Heart Association:	1
11. Self:	6
12. Employer:	2
13. Physical Therapists:	1
14. No response:	1
15. Everyone:	1
16. Colleagues:	1
17. Medical insurance carrier:	1
18. Nutritionist:	1

Table 5-C

Question #5:

What individual or group of people would disapprove of your participation in a cardiac rehabilitation exercise program 4 to 6 weeks after a heart attack?

BELIEF**FREQUENCY**

19. None:	27
20. Spouse:	3
21. Unknown:	4
22. Family:	6
23. Co-workers:	1
24. Friends:	2
25. Children:	2
26. Self:	1
27. Enemies:	1
28. People who don't take a heart attack seriously:	1
29. People who don't understand positive effects of exercise on heart attack victim:	1

Table 6-C

Question #6:

Which people whom you know other than the ones just listed would be interested in your taking part or not taking part in a cardiac rehabilitation exercise program 4 to 6 weeks after a heart attack?

BELIEF	FREQUENCY
30. None:	10
31. Family:	6
32. Friends:	7
33. Children:	1
34. Nurses:	2
35. Atrium personnel:	1
36. Business associates:	1
37. Physical therapists:	1
38. Insurance company:	2
39. Employer:	5
40. Other cardiac patients:	1
41. Church members:	1

Table 7-C
Question #7:

These individuals or groups of people, who is most important to you?

42. Doctor:	6
43. Nurses:	2
44. Spouse:	16
45. Family:	16
46. Children:	4
47. Friend(s):	11
48. Self:	4
49. Physical Therapists:	1
50. Business associates:	1

APPENDIX D

QUESTIONNAIRE (PHASE 2)

The following are some statements that patients have made about exercising in a cardiac rehabilitation program four to six weeks after their heart attack. Please indicate how likely or unlikely the statements are true for you. Make a mark in the place that most closely describes your response. Please do not skip any items.

- I. **I BELIEVE THAT EXERCISE IN A CARDIAC REHABILITATION PROGRAM FOUR TO SIX WEEKS AFTER MY HEART ATTACK WILL:**
1. Help to increase and strengthen my heart muscle.
Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely
 2. Increase my confidence regarding my physical condition.
Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely
 3. Have no bad effects.
Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely
 4. Get me back in good physical shape.
Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely
 5. Produce stress from fear that exercise can cause another heart attack.
Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely
 6. Prepare me for my regular daily routine.
Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely
 7. Help me to realize that exercise under supervision is healthy, not dangerous.
Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely
 8. Be dangerous so soon after a heart attack.
Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely

II. DECIDE WHETHER THESE OUTCOMES OF EXERCISE IN A CARDIAC REHABILITATION PROGRAM ARE GOOD OR BAD.

9. Help to increase and strengthen my heart muscle.

Good _____ Bad
extremely quite slightly neither slightly quite extremely

10. Increase my confidence regarding my physical condition.

Good _____ Bad
extremely quite slightly neither slightly quite extremely

11. Have no bad effects.

Good _____ Bad
extremely quite slightly neither slightly quite extremely

12. Get me back in good physical shape.

Good _____ Bad
extremely quite slightly neither slightly quite extremely

13. Produce stress from fear that exercise can cause another heart attack.

Good _____ Bad
extremely quite slightly neither slightly quite extremely

14. Prepare me for my regular daily routine.

Good _____ Bad
extremely quite slightly neither slightly quite extremely

15. Help me to realize that exercise under supervision is healthy, not dangerous.

Good _____ Bad
extremely quite slightly neither slightly quite extremely

16. Be dangerous so soon after a heart attack.

Good _____ Bad
extremely quite slightly neither slightly quite extremely

III. Please make a mark that most closely describes what you think or feel.

17. In general, I think that exercise is a cardiac rehabilitation program is:

Good _____ Bad
extremely quite slightly neither slightly quite extremely

Wise _____ Foolish
extremely quite slightly neither slightly quite extremely

Pleasant _____ Unpleasant
extremely quite slightly neither slightly quite extremely

APPENDIX D

- IV. Below are some people or groups who may be influential in decision making by patients. Please indicate the extent to which you think the following people/groups think THAT YOU SHOULD EXERCISE IN A CARDIAC REHABILITATION PROGRAM FOUR TO SIX WEEKS AFTER YOUR HEART ATTACK. Make a mark in the space that most clearly describes your response. Please do not skip any items.

18. My family thinks.

I should _____ Should not
extremely quite slightly neither slightly quite extremely

19. My physician thinks.

I should _____ Should not
extremely quite slightly neither slightly quite extremely

20. My friends think.

I should _____ Should not
extremely quite slightly neither slightly quite extremely

- V. Generally speaking, HOW IMPORTANT IS IT TO YOU TO DO WHAT THESE PEOPLE/GROUPS WANT YOU TO DO? Please make a mark in the space that most clearly describes your responses. Please do not skip any items.

21. I want to do what my family wants me to do.

Very much so _____ Not at all not
extremely quite slightly neither slightly quite extremely

22. I want to do what my physician wants me to do.

Very much so _____ Not at all not
extremely quite slightly neither slightly quite extremely

23. I want to do what my friends want me to do.

Very much so _____ Not at all not
extremely quite slightly neither slightly quite extremely

VI. Please mark the response that most nearly describes what you think or how you feel.

24. In general, most of the people or groups that are important to me think

I should _____ Should not
extremely quite slightly neither slightly quite extremely

exercise in a cardiac rehabilitation program in four to six weeks after my heart attack.

APPENDIX D

QUESTIONNAIRE (PHASE 2)

VII. Please respond to the following questions.

25. I intend to exercise in a cardiac rehabilitation program in four to six weeks after my heart attack.

Likely _____ Unlikely
 extremely quite slightly neither slightly quite extremely

BEHAVIOR INTENTION BIPOLAR SCALE

Likely _____ Unlikely
 +3 +2 +1 +0 -1 -2 -3

APPENDIX D

QUESTIONNAIRE (PHASE 2)

VIII. Please indicate how likely or unlikely the following statements are true for you. Make a mark in the place that most closely describes your beliefs. Please do not skip any items.

I BELIEVE THAT EXERCISE IN A CARDIAC REHABILITATION PROGRAM FOUR TO SIX WEEKS AFTER MY HEART ATTACK WILL:

26. Not be necessary because I am in good physical condition.

Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely

Good _____ Bad
extremely quite slightly neither slightly quite extremely

27. Probably bring on an early death.

Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely

Good _____ Bad
extremely quite slightly neither slightly quite extremely

28. Be impossible since I don't have the energy or physical stamina to exercise.

Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely

Good _____ Bad
extremely quite slightly neither slightly quite extremely

29. Not be necessary because I would rather exercise by myself than participate in a group exercise program.

Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely

Good _____ Bad
extremely quite slightly neither slightly quite extremely

30. Be unlikely since I am unable to exercise due to my heart attack and need to take it easy.

Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely

Good _____ Bad
extremely quite slightly neither slightly quite extremely

31. Not be necessary because I may not be able to return to work after my heart attack.

Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely

Good _____ Bad
extremely quite slightly neither slightly quite extremely

32. Not be necessary since I am not the whole person I was before my heart attack.

Likely _____ Unlikely
extremely quite slightly neither slightly quite extremely

Good _____ Bad
extremely quite slightly neither slightly quite extremely

APPENDIX E**LIST OF HOSPITALS**

Rhode Island Hospital

The Miriam Hospital

Kent County Memorial Hospital

Landmark Medical Center

Roger Williams General

Newport Hospital

Memorial Hospital of Rhode Island

St. Joseph Hospital, Fatima Unit

South County Hospital

APPENDIX F

DEMOGRAPHIC DATA FORM

Today's date: _____ Hospital: _____

Name: _____

Address: _____

Date of birth: _____ Race: _____

Cardiologist: _____

Education: Grammar school ☐ High school ☐ College ☐ Graduate degree ☐Marital Status: Married ☐ Co-habiting ☐ Divorced ☐ Separated ☐ Widowed ☐

Occupation: _____

Spouse's Occupation: _____

Approximate income:	\$10,000 - 20,000	<input type="checkbox"/>	\$40,000 - 50,000	<input type="checkbox"/>
	\$20,000 - 30,000	<input type="checkbox"/>	over \$50,000	<input type="checkbox"/>
	\$30,000 - 40,000	<input type="checkbox"/>		

Do you smoke? No _____ Yes _____ # packs / day _____

Do you have any physical impairments that would limit or prevent you from participating in a cardiac rehab program?

No _____ Yes _____

If answer is Yes, please explain reason:

Cardiac Rehab Program location I am planning to attend is:

Who told you about the Cardiac Rehab Program?

M.D. _____ Nurse _____ Family _____ Friend _____ Other _____

Do you have transportation to the Cardiac Rehab Program?

No _____ Yes _____

Is the time of the Cardiac Rehab Program convenient for you and/or your spouse?

No _____ Yes _____

Will your medical insurance cover the Cardiac Rehab Program?

No _____ Yes _____

If no, would you be willing to pay for the program yourself? _____

Exercise history:

What do you consider exercise/physical activity? Explain:

Did you regularly exercise before your heart attack? Explain:

Activity/exercise: _____

Duration: _____

Times/week: _____

Does your spouse/significant other regularly exercise? Explain:

Activity/exercise: _____

Duration: _____

Times/week: _____

APPENDIX G

CONSENT FORM FOR RESEARCH

BROWN UNIVERSITY AFFILIATED HOSPITALS

THE MIRIAM HOSPITAL

TITLE OF STUDY: Determinants of Exercise Behavior After a Myocardial Infarction: Beliefs, Intention, Behavior

I have been asked to take part in a research project, described below.

The researcher (or my doctor), Elaine Amato-Vealey, RN, MS, will explain the project to me in detail. I should feel free to ask questions. If I have more questions later, Elaine Amato-Vealey, the person mainly responsible for this study, (Phone: 277-4780), will discuss them with me.

1. **THE STUDY.**

I have been asked to take part in this study because I have had a heart attack. This study will identify beliefs attitudes (thoughts and feelings) toward exercise after a heart attack.

2. **WHAT WILL BE DONE.**

If I decide to participate in the study, here is what will happen:

My participation involves completing one questionnaire just before discharge from the hospital. The questions I will be asked pertain to my beliefs, feelings, values (attitudes) and intention toward exercise in a cardiac rehabilitation program. The questionnaire will take approximately 10 - 20 minutes to complete.

3. **WHAT IS EXPERIMENTAL:**

The parts of the study that are experimental are:

I understand this study is a nursing research investigation designed to explain, understand and predict exercise behavior after a heart attack.

4. **RISKS OR DISCOMFORTS:**

I should not experience any particular discomfort or risks associated with this study. My participation will involve 10-20 minutes of my time.

5. **BENEFITS:**

Although there will be no direct benefit to me from my taking part in this study, the researchers may learn more about beliefs and attitudes as well as my family and friend's thoughts and feelings about exercise after a heart attack.

6. **ALTERNATIVES.**

There is no alternative to my participation in this study.

7. **CONFIDENTIALITY.** My part in this study is confidential. None of the information will identify me by name. The findings of this study may be used for medical publication. All records for this project will be handled according to hospital policy for medical records, Federal guidelines, and Rhode Island law on confidentiality of health-care information.
8. **MY DECISION AND RIGHT TO QUIT AT ANY TIME.** The decision whether or not to take part in this study is up to me. I do not have to participate. If I decide to take part in the study, I may quit at any time. Whatever I decide will not in any way change my relationship with my doctor or affect my treatment at The Miriam Hospital.
9. **RIGHTS AND COMPLAINTS.** If I am not satisfied with the way this study is performed, I may report my complaints (anonymously, if I choose) to Mr. Edward M. Schottland, or to the Clinical Research Review Board of The Miriam Hospital (Phone: 331-8500, ext. 2002). I may discuss any questions about my rights as a research subject with Mr. Schottland.
10. **COMPENSATION IN CASE OF INJURY.** If this study causes me any injury, I should call Ms. Diana Wolfenden, R.N. (331-8500, ext. 2012). If I need medical treatment and am hospitalized at The Miriam Hospital as a result of the study, the Hospital will provide services at no charge to me over and above my health insurance. The Miriam Hospital does not routinely provide any other compensation for injury.
11. **MY CONSENT.** My signature on this form means that I understand the information, and that I have decided to participate in the study.

A copy of this form will go to:

_____ Me _____ Researcher _____ Other (Specify)

_____ The hospital's Medical Records Department (if appropriate)

**I HAVE READ THE CONSENT FORM AND FULLY UNDERSTAND IT.
ALL MY QUESTIONS HAVE BEEN ANSWERED. I AGREE TO TAKE
PART IN THE STUDY.**

Signature of Patient

Name of person explaining study
(print or type)

Date

Signature of person explaining study

Signature of Witness

Date

Date

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